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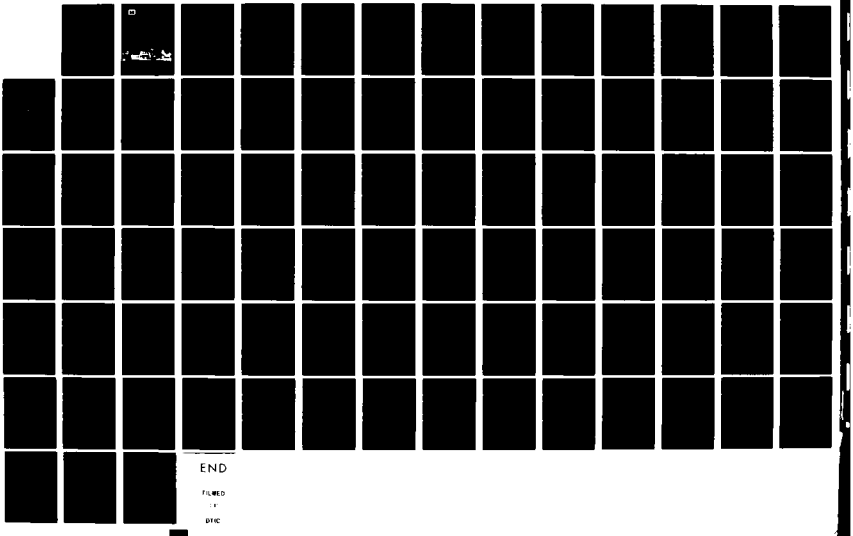

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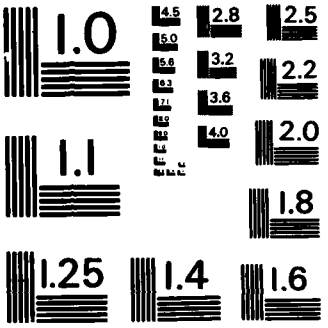


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TECHNICAL REPORT GL-82-12

# MOBILITY ASSESSMENT OF THE ROLAND WHEELED VEHICLE SYSTEM

## Report 2

## MOBILITY ASSESSMENT USING THE ARMY MOBILITY MODEL

by

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September 1982

Report 2 of a Series



Prepared for U. S. Army Missile Command
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20. ABSTRACT *(Continue on reverse side if necessary and identify by block number)*

The study evaluates the relative mobility performance of a primary candidate ROLAND missile carrier for the Rapid Deployment Force (RDF) based on the M812A1, 6x6 truck chassis with 11.00 X20 dual tires, an alternative on 14.00 X20 dual tires, and a third assuming use of the M977, 8x8, 10-ton truck chassis with 16.00 R20 tires. The standard M813A1, 5-ton, 6x6 cargo truck and M109A1 self-propelled howitzer (tracked) are included for reference.

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20. ABSTRACT (Continued).

Performances are assessed in study terrains typical of the central highlands in the Federal Republic of Germany, of northwest Jordan, and of the mountains in southwest Iran, in dry, wet, wet-wet slippery, snow and sand surface conditions, as appropriate.

The evaluations use on-road and off-road predictions from the Army Mobility Model (AMM) and linear feature crossing predictions from the SWIMCRIT/WACROSS water-crossing model in conjunction with suitable digital mobility-terrain data bases.

Vehicles in the study are compared in each study terrain and condition primarily in terms of (a) percent of area in which each is immobile (NOGO), and mean speeds achievable in the 50 percent and 80 percent of the area offering the least impedance to the vehicle ($V_{50}$ and $V_{80}$); (b) percent of total trail distance which is NOGO, and mean speeds on primary roads, on secondary roads, and on trails, and (c) rating speeds for operations at a special level of mobility or mission profile proposed by the U. S. Army Missile Command as most appropriate for the carrier.

Excursions are made to examine the effect on performance statistics, first including a requirement for side slope operation in all terrrain situations, and second of using ride at the commander's station rather than at the driver's station as a possible speed-limiting factor.

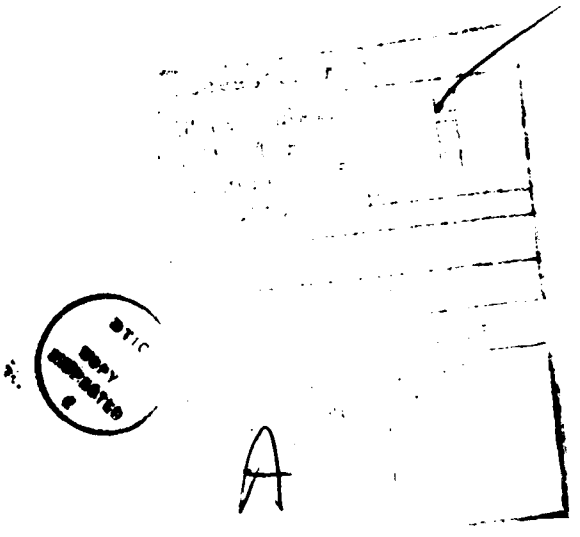
Appendices identify study terrains, list values of vehicle parameters used in AMM, present complete speed profile data and reasons for NOGO's, and tabulate gap-crossing times and rating speeds for five standard levels of mobility.

# PREFACE

Personnel of the U. S. Army Engineer Waterways Experiment Station (WES) conducted the study described herein during the period March to April 1982 for the U. S. Army Missile Command, Redstone Arsenal, Ala., under Intra-Army Order for Reimbursable Services DX588 dated 4 March 1982.

The study was conducted under the general supervision of Dr. W. F. Marcuson III, Chief, Geotechnical Laboratory (GL); Messrs. C. J. Nuttall, Chief, Mobility Systems Division (MSD), GL; and D. D. Randolph, Chief, Methodology and Modeling Group (MMG), MSD, GL. Mr. Randolph directed the overall study. Messrs. Keafur Grimes and R. P. Smith, MMG, and R. B. Ahlvin and B. R. Wright, Computations and Analysis Group, MSD, prepared the mobility predictions. Mr. R. G. Temple, Mrs. E. P. Roberts, and Mrs. F. B. Ponder, MMG, prepared the vehicle characteristics data, data tables, and graphics for this report. Messrs. Grimes and Randolph prepared this report.

COL Tilford C. Creel, CE, was Commander and Director of the WES during course of this study and preparation of this report. Mr. Fred R. Brown was Technical Director.



CONTENTS

## CONVERSION FACTORS, U. S. CUSTOMARY TO METRIC (SI) UNITS OF MEASUREMENT

U. S. customary units of meaurement used in this report can be converted to metric (SI) units as follows:

| Multiply | by | To obtain |
|---|---|---|
| horsepower (550 foot-pounds (force) per second) | 745.6999 | watts |
| horsepower (550 foot-pounds (force) per second) per ton | 83.82 | watts per kilonewton |
| inches | 2.54 | centimetres |
| kips (force) | 4.448222 | kilonewtons |
| miles (U. S. statute) | 1.609347 | kilometres |
| miles (U. S. statute) per hour | 1.609347 | kilometres per hour |
| pounds (force) | 4.448222 | newtons |
| pounds (force) per square inch | 6.894757 | kilopascals |
| pounds (mass) | 0.45359237 | kilograms |
| square inches | 6.4516 | square centimetres |
| tons (2000 pounds, mass) | 907.1847 | kilograms |

# MOBILITY ASSESSMENT OF THE ROLAND WHEELED VEHICLE SYSTEM

## MOBILITY ASSESSMENT USING THE ARMY MOBILITY MODEL

## PART I: INTRODUCTION

### Background

1. The ROLAND All Weather Short Range Air Defense System (SHORADS) was originally configured for production using the XM975 (M109 derivative) tracked vehicle as the carrier for the launcher system (fire unit). The ROLAND system under development by the Boeing Aerospace Company as a contractor to the U. S. Army Missile Command (MICOM) was restructured to have the fire unit transported by a wheeled vehicle for use by the Rapid Deployment Force (RDF). After a study was made, the M812A1* 5-ton,** 6x6 chassis was chosen by MICOM as the carrier for the ROLAND system.

2. MICOM asked WES to assess the mobility of the wheeled ROLAND vehicle system. Report 1 provides field results about the ride quality for the driver and commander performance, vehicle stability, and controllability of the M812A1 when fitted with a simulated ROLAND launcher system. This report assesses the mobility of the ROLAND wheeled vehicle system and other comparison vehicles using current WES analytical evaluation methodology.

3. The AMC-74X version of the Army Mobility Model (AMM) was used to obtain mobility data for this study rather than the NATO Reference Mobility Model (NRMM) version so modifications could be made to evaluate the effects of side slope. AMC-74X gives essentially the same results as NRMM.

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* Developed as a carrier for the Ribbon bridge and later used as a carrier for the HONEST JOHN missile system.

** A table of factors for converting U. S. customary units of measurement to metric (SI) units is presented on page 4.

## Objectives

4. The objective of the WES study was to provide mobility predictions for the ROLAND wheeled vehicle and other comparison vehicles in available study terrains in the Federal Republic of Germany, Jordan,* and Iran.

## Scope

5. Principal activities accomplished in the achievement of study objectives were:

a. The AMC-74X version of AMM (Nuttall and Randolph 1976) was used to predict off-road and on-road performance of six study vehicles in the study areas in the Federal Republic of Germany, Jordan, and Iran. Performance was predicted in terms of speed profiles for dry, wet normal, wet-wet slippery, snow, and sand conditions on primary roads, secondary roads, trails, and off-road; and in terms of percent NOGO and reasons for NOGO when operating on trails and off-road.

b. The SWIMCRIT water-crossing and WACROSS methodology (Nuttall 1979) were used to predict water-crossing performance of the study vehicles in the study areas.

c. AMC-74X was modified to predict the performance of the study vehicles during side slope operations.

## Contents of Report

6. This report contains a main text and three appendices. Appendix A describes the complete vehicle data used by the predictive models and gives the terrain or road factors and their ranges. Appendix B gives the detailed mobility data developed by using the mobility models. Appendix C gives the compilation of the mobility rating speeds for tactical mobility levels.

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* Quads in Jordan have been called "Mid-East Study Area" in previous studies such as the HIMO Study (Nuttall and Randolph 1976).

## Definitions

7. The following are definitions of terrain and vehicle terms:

   a. Cone index (CI). An index of the shearing resistance of a medium obtained with a cone penetrometer.

   b. Remolding index (RI). A ratio that expresses the portion of the original strength of a soil that will be retained after traffic of a moving vehicle.

   c. Rating cone index (RCI). The product of the RI and the average of the measured in situ CI for the same layer of soil.

   d. Vehicle cone index (VCI). The minimum RCI that will permit a vehicle to complete a specified number of passes; thus, $VCI_{50}$ means the minimum RCI necessary to complete 50 passes, and $VCI_1$ means the minimum RCI to complete 1 pass.

   e. $V_{50}$, $V_{80}$, $V_{90}$, and $V_{100}$. The average speed a vehicle can maintain over a given percentage (designated by the subscript number) of the best terrain in a given area (i.e., where the vehicle can make higher speeds). Thus, $V_{80}$ means average speed of a vehicle over the best 80 percent of the terrain.

## PART II: STUDY VEHICLES, TERRAIN DATA, SURFACE CONDITIONS, AND SCENARIO

### Study Vehicles

8. Five vehicles were evaluated in this study, each using ride dynamics response at the driver's seat as a possible speed-limiting factor. One of these (Vehicle 1) was also run using ride at the commander's seat in place of ride at the driver's seat. This set of runs is designated as Vehicle 6. Vehicles 1 and 2 (and 6) were 5-ton trucks (M812A1, 6x6) modified to carry the ROLAND missile. Vehicle 3 was a 10-ton truck (M977,* 8x8) modified to carry the ROLAND missile, and Vehicles 4 and 5 were reference vehicles--the M813A1, 6x6, 5-ton cargo truck and the M109A1, tracked, self-propelled howitzer.

9. Vehicle 1 is the proposed transporter for the ROLAND missile. Earlier versions of the ROLAND system were mounted on the XM975, which used the M109 chassis.

10. The study vehicles are listed below:

| Vehicle No. | Study Vehicle Description |
|---|---|
| 1 | Proposed ROLAND missile vehicle (M812A1, 6x6, 5-ton bridge truck modified to carry the ROLAND missile and equipped with 11.00 X20 tires, duals on rear axles) |
| 2 | ROLAND missile concept vehicle (M812A1, 6x6, 5-ton bridge truck modified to carry the ROLAND missile and equipped with 14.00 X20 tires, duals on rear axles) |
| 3 | M977 Mod ROLAND missile concept vehicle (M977, 8x8, 10-ton cargo truck modified to carry the ROLAND missile and equipped with 16.00 R20 tires, singles on each axle) |
| 4 | M813A1, 5-ton cargo truck (equipped with 11.00 X20 tires, duals on rear axles) loaded |
| 5 | M109A1 self-propelled howitzer (tracked) |
| 6 | Proposed ROLAND missile vehicle (same as Vehicle 1 except dynamic response measured at the commander's seat were used rather than that measured at the driver's seat.**) |

* One of the family of 10-ton Heavy Expanded Mobility Tactical Trucks (HEMTT).

** Vehicles 1-5 used dynamic response measured at the driver's seat.

11. Important characteristics of the study vehicles are listed in Table 1. The complete list of vehicle characteristics and performance data used to make mobility predictions for the study vehicles are given in Appendix A.

## Terrains

12. AMM was used to predict the performance of each study vehicle in the off-road terrain in the Lauterbach quad (L5322) and the on-road performance in the Schotten quad (L5520) (no road data were available for the Lauterbach quad) in the Federal Republic of Germany. AMM was used to predict the performance of each study vehicle in the off-road terrain and on-road network in the Mafraq quad (3254 IV) in Jordan and the Dasht-E Arzhan quad (6349 II) in Iran. The locations of the Lauterbach and Schotten quads are shown in Figure 1, the Mafraq quad in Figure 2, and the Dasht-E Arzhan quad in Figure 3.

13. The SWIMCRIT model and WACROSS methodology were used to predict the performance of the study vehicles in the Lauterbach quad in the Federal Republic of Germany and the Mafraq quad in Jordan. There were no linear feature data available for the Iran quad but since both the Mafraq and Iran quad are similar, the Mafraq data were used for the Iran quad.

### Road and areal terrain data

14. The road and areal (off-road) terrain data were prepared from several types of maps at a scale of 1:50,000. The resulting mobility-terrain data describing road and areal terrain units for use in this study are considered to be of "study quality." That is, specific values for many terrain factors involved were largely inferred from available qualitative data sources interpreted in the context of local climate, cultural practices, etc., but little or no ground truth data were used. As a result, it cannot be guaranteed that the specific set of mobility-terrain factor values assigned to a given point on a map will, in fact, be found at that point on the ground.

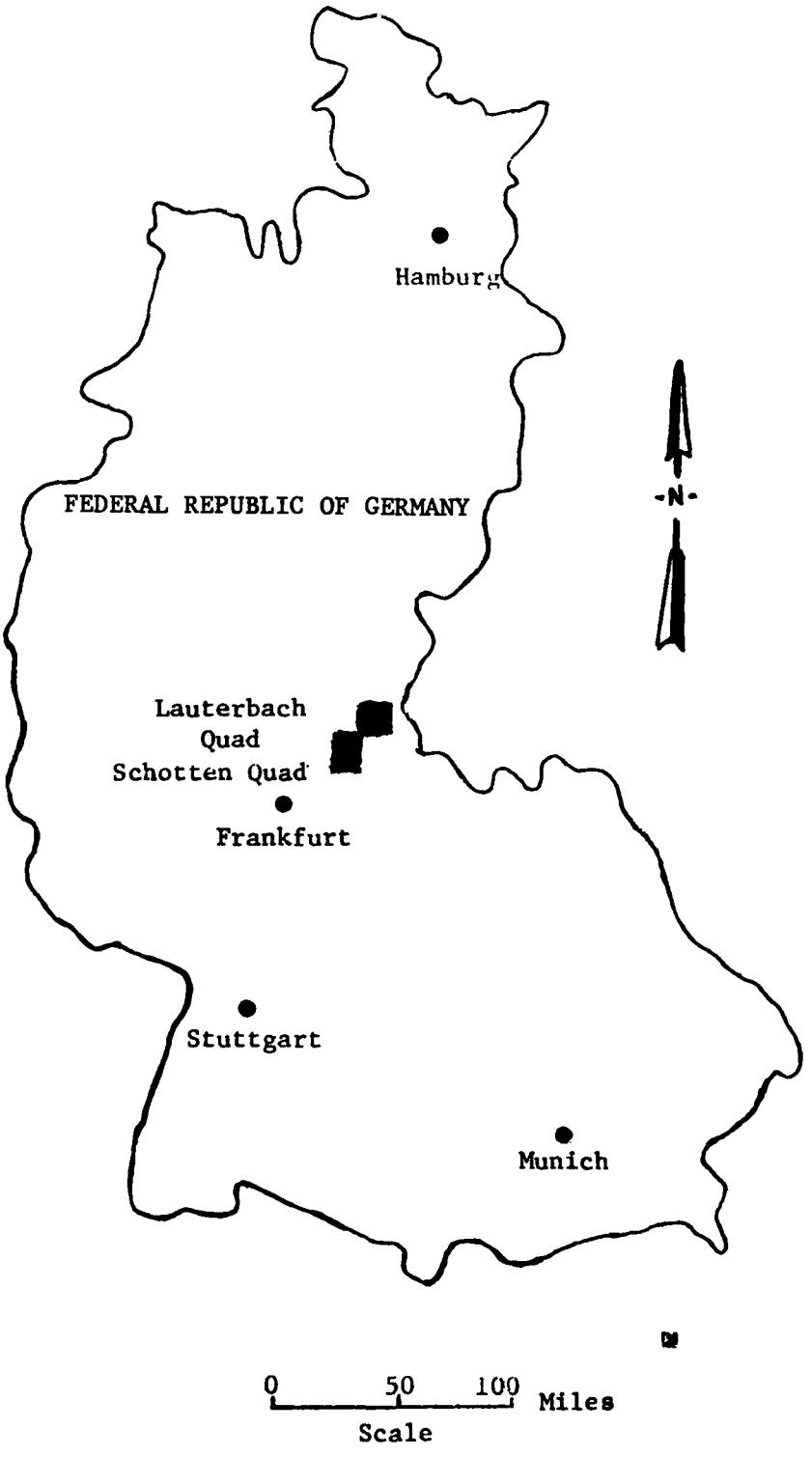



**Figure 1. Location of the Federal Republic of Germany study areas**

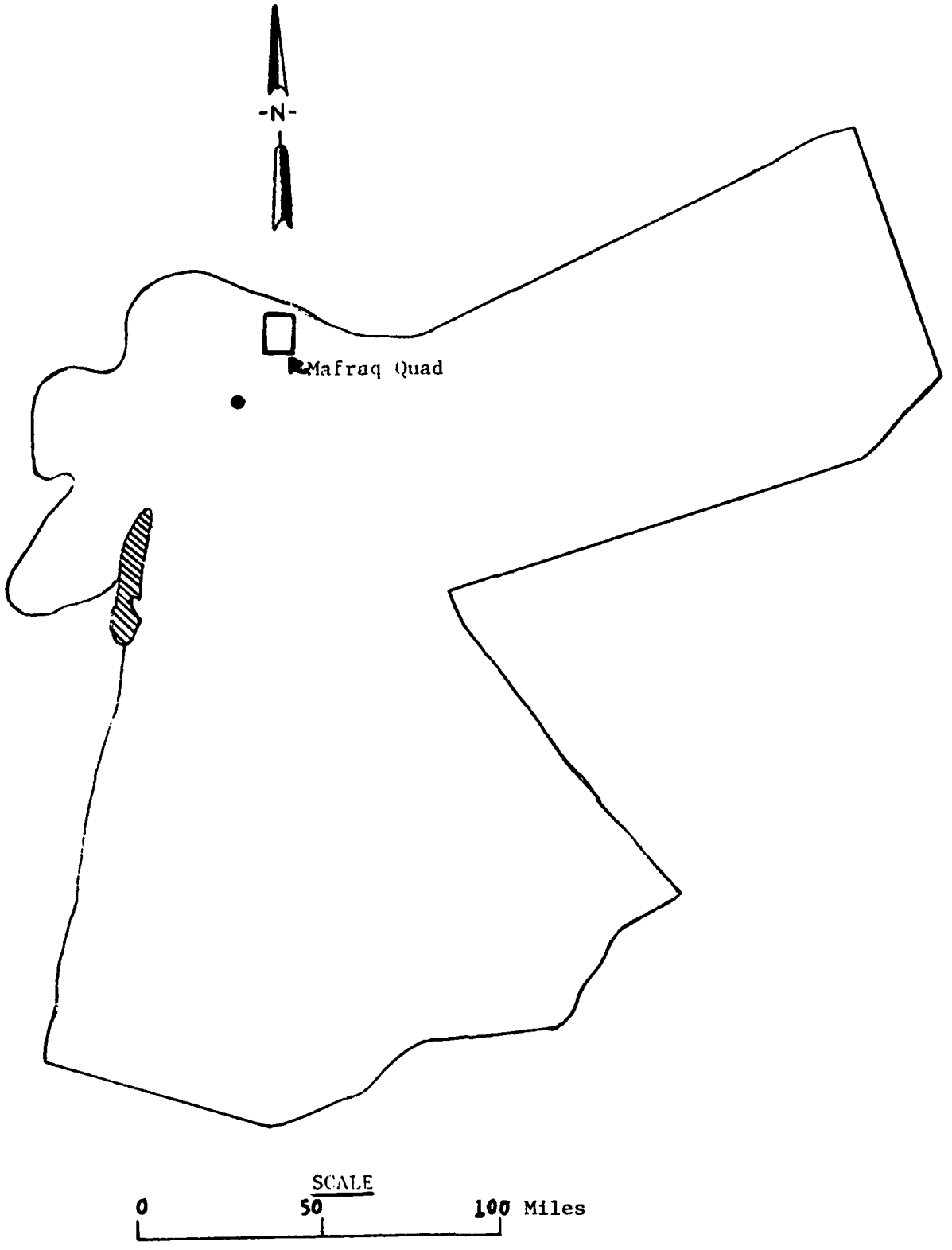



Figure 2. Location of the Jordan study area

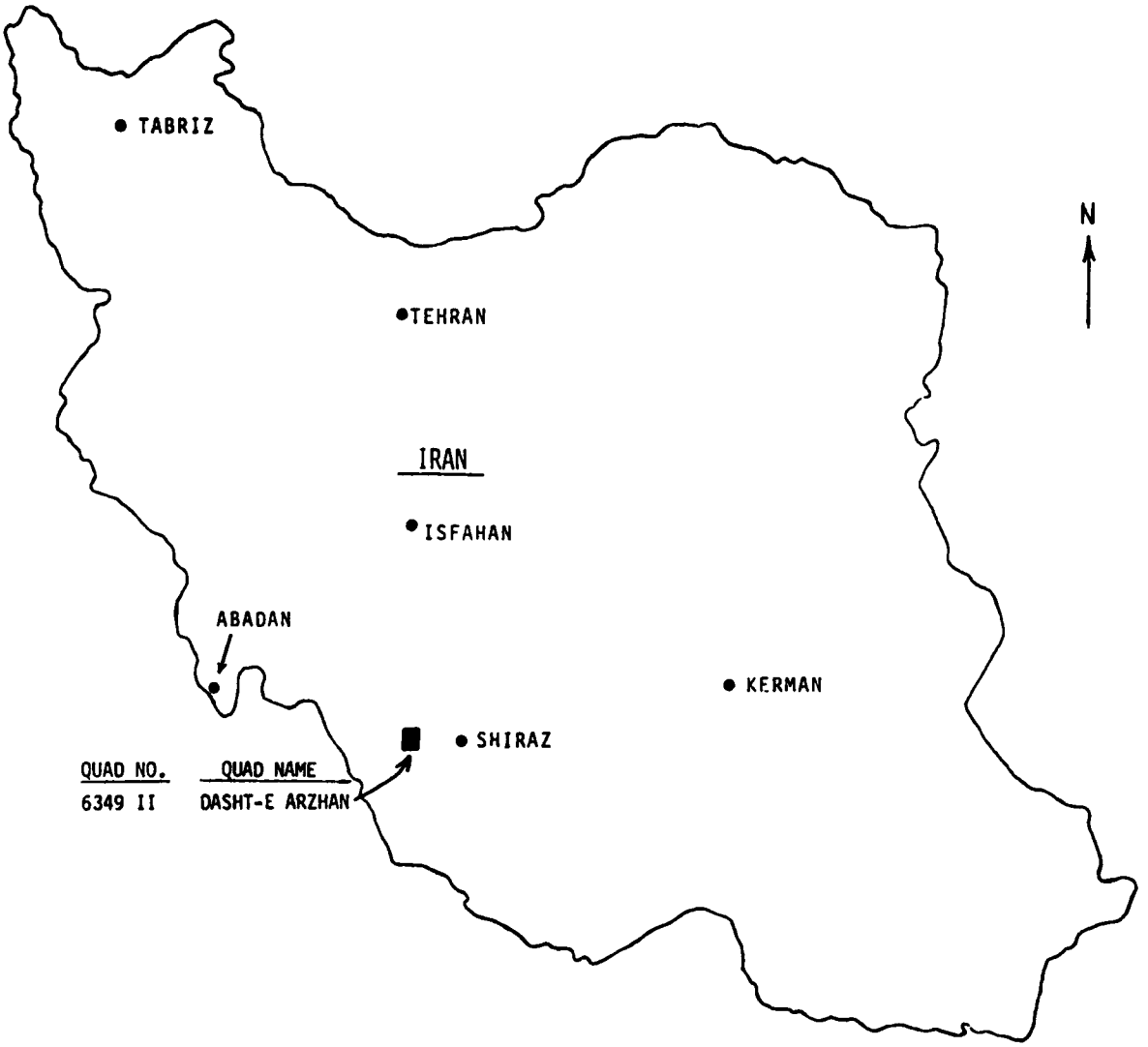



Figure 3. Location of the Iran study area

15. However, the area as characterized is generally representative of the levels, associations, and areal distribution of those factors influencing vehicle mobility performance throughout this area as a whole.

16. It is felt that the study quality road and areal terrain data for the quads in the Federal Republic of Germany, Jordan, and Iran are acceptable for comparing the study vehicles.

Linear features

17. The linear feature data used in this study to describe potential water-crossing features were those developed for the WACROSS study (Nuttall 1979) and are also of study quality. These data are believed to be representative of the linear features in the study area.

## Surface Conditions

18. The seasonal conditions in which the areal terrain and road data were considered are as follows:

a. Dry normal. (All study areas.) The dry normal surface condition describes the lowest soil moisture and associated highest soil strength found during the driest 30-day period for an average rainfall year and assumes that it has been at least 6 hr since the last rainfall.

b. Wet normal. (Federal Republic of Germany study areas only.) The wet normal condition describes soil moisture and associated soil strength found during the wettest 30-day period for an average rainfall year. The assumption is that it has been at least 6 hr since any rainfall.

c. Wet-wet slippery. (Federal Republic of Germany and Jordan study areas.) The wet-wet slippery surface condition describes the highest soil moisture and associated reduced soil strength found during the wettest 30-day period for a maximum rainfall year. The assumption of continuing rain makes the situation less favorable because of potential slipperiness on soils where strength would otherwise be adequate for flotation.

d. Snow. (Federal Republic of Germany study areas only.) The snow condition assumes that the terrain and trails are frozen and uniformly covered by 10 in. of dry snow, which is a reasonable maximum average depth for the area. Differences in snow depth or characteristics in forested areas or due to drifting snow are not considered.

e. Sand. (Jordan study area only.) Predictions were made for a condition in which the actual terrain was arbitrarily coverted to an all-sand terrain to represent sand dunes. This was accomplished by converting all actual soils to dry desert sand with appropriately reduced strengths and doubling all slopes to a maximum of 60 percent (the appropriate angle of repose of dune sands frequently found on the lee side of desert dunes). Characteristics of all roads and trails were unchanged, except the soil-surfaced trails were assumed to be trails in sand.

## Scenario Conditions

19. In the Federal Republic of Germany study area, a special excursion assessed the increase in percent NOGO due solely to side slope operations. This was done by the addition of side slope operation algorithms to examine more closely for possible NOGOs than is done in the basic model. Simple algorithms were added which check for possible vehicle roll-over due to total effective side slope angle, including side-to-side differential, sinkage, and unfavorable encounters with obstacles. $VCI_1$ was recomputed to reflect lateral weight transfer on the slope and was used as the basis for traction checks. No attempt was made at this time to adjust GO speeds on side slopes.

## PART III: MOBILITY PREDICTIONS

### Ride and Shock Data

20. Ride and shock tests were conducted at WES on the proposed ROLAND missile vehicle (Vehicle 1) with simulated missile load and load distribution. The results of these tests were used to establish ride and shock characteristics at both the driver's and commander's positions used in describing Vehicles 1, 2, and 6. The VEHDYN model (Murphy and Ahlvin 1976) was used to determine the ride and shock behavior of the M977, 10-ton cargo truck; these data were used in describing Vehicle 3. Measured ride and shock data from previous studies were used for the reference vehicles (Vehicles 5 and 6).

#### Ride data

21. Ride quality over continuous rough terrain is presently expressed in terms of absorbed power at the driver's seat and is used as a basis for assessing the speed at which a driver will operate his vehicle. Absorbed power as a quantitative ride criterion was proposed in the 1960's as a result of laboratory tests at the U. S. Army Tank-Automotive Command (TACOM), partially validated in brief field trials during the late 1960's, and adopted in 1971 for use in the first version of AMM (AMC '71) (Pradko, Richard, and Kaluza 1966). Field tests indicate that a normally seated driver will not willingly subject himself to more than 6 watts of vertical absorbed power for more than 15-30 min at a time; severe fatigue results from higher exposure. Accordingly, vehicle speed at 6 watts of vertical absorbed power is currently accepted as the criterion for limiting speed due to vibrations.

22. Surface roughness of the terrain over which a vehicle is operating is quantified as the root-mean-square (rms) elevation of points along a path profile measured at 1-ft intervals detrended to remove slopes and long swales. The speed at 6-watts vertical absorbed power versus rms elevation in inches for each of the study vehicles is given in Appendix A, Table A4.

Shock data

23. The ability of vehicles to negotiate abrupt discrete obstacles is an important aspect of vehicle ground mobility. Logs, boulders, rice paddy dikes, etc., are encountered often in off-road travel and produce speed-controlling shock loads. Results of past studies indicate that obstacle height is a suitable first-order descriptor for characterizing such discrete obstacles. The response criterion currently used for limiting vehicle speed is that level at which the driver's vertical acceleration reaches 2.5 g's. The obstacle height versus speed at 2.5 g's for the study vehicles is given in Appendix A, Table A5.

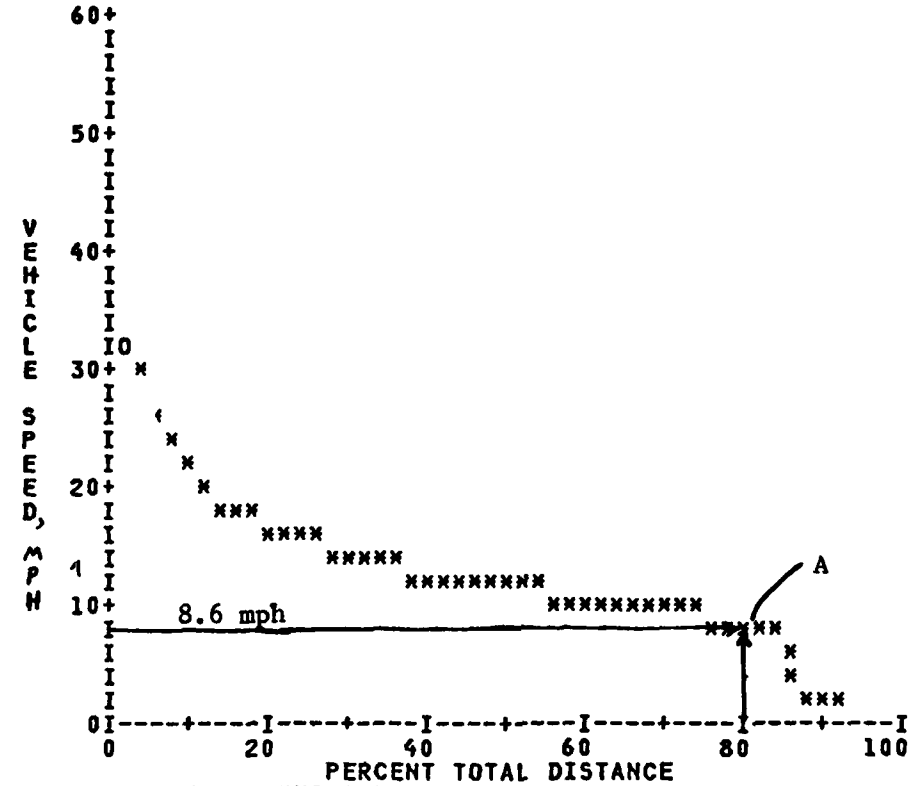
## On- and Off-Road Predictions

24. AMM (Nuttall and Randolph 1976) was used to predict on- and off-road performance for each of the study vehicles for the dry, wet normal, wet-wet slippery, and snow conditions of the Lauterbach quad (L5322) and Schotten quad (L5520) in the Federal Republic of Germany; dry, wet-wet slippery, and sand conditions in the Mafraq quad (L3254 IV) in Jordan; and dry surface condition in the Dasht-E Arzhan quad (6349 II) in Iran.

25. The basic output from the model is the maximum speed for a given vehicle in each road or terrain unit. The output data for the entire study area can be usefully displayed directly as a speed map or statistically as a speed profile. The output for this study is the speed profile.

26. The off-road speed profile for a given vehicle, terrain, and surface condition shows the average speed the vehicle can sustain as a function of the percentage of the total area under consideration that it avoids, under the assumption that it avoids areas posing the greatest impediment to its motion. An example of an off-road speed profile is given in Figure 4. This example shows that at point A, Vehicle 1 (the proposed ROLAND missile vehicle) can average 8.6 mph while negotiating the best 80 percent of the terrain in the Federal Republic of Germany

Germany Quad-5322 Areal Predictions (MICOM)
Vehicle 1




PERCENT DISTANCE "NO-GO" = 15.0

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 46.0 | 32.3 | 27.8 | 25.1 | 23.2 |
| 1X | 21.4 | 20.1 | 19.0 | 18.0 | 17.3 |
| 2X | 16.6 | 16.1 | 15.7 | 15.2 | 14.7 |
| 3X | 14.3 | 14.0 | 13.6 | 13.2 | 12.9 |
| 4X | 12.6 | 12.3 | 12.1 | 11.8 | 11.6 |
| 5X | 11.4 | 11.2 | 11.0 | 10.8 | 10.6 |
| 6X | 10.5 | 10.3 | 10.1 | 9.9 | 9.8 |
| A 7X | 9.6 | 9.4 | 9.2 | 9.0 | 8.8 |
| 8X | 8.6 | 8.4 | 8.1 | 3.9 | 2.1 |
| 9X | 1.5 | 1.1 | 0.9 | 0.8 | 0.7 |
| 10X | 0.6 | | | | |

ACCUMULATED SPEED

Figure 4. Off-road speed profile

(Lauterbach quad) and avoiding the worst 20 percent of the terrain in the same study area.

27. The on-road speed profile for a given vehicle, road type (primary, secondary, or trail), and surface condition shows the average speed the vehicle can sustain as a function of the percentage of the total distance under consideration that it avoids, under the assumption that it avoids roads and trails posing the greatest impediment to its motion. An example of an on-road speed profile is shown in Figure 5.

28. The speed profiles for each study vehicle on primary and secondary roads, trails, and off-road are given in Appendix B, Tables B1-B18.

29. There were no NOGOs on primary and secondary roads. The percent NOGO for each study vehicle under the various surface conditions on trails and off-road is given in Appendix B, Tables B19-B21.

## Linear Feature Performance Predictions

30. The linear feature performance predictions were made using the SWIMCRIT gap-crossing model (Nuttall and Randolph 1976). The characteristics of the study vehicles and the linear feature data required for the SWIMCRIT model are included in Appendix A.

31. The WACROSS methodology was used to determine, for each of three seasonal water stages for the area, and for each vehicle:

a. The mean number of stream crossings that must be negotiated per mile during cross-country travel.

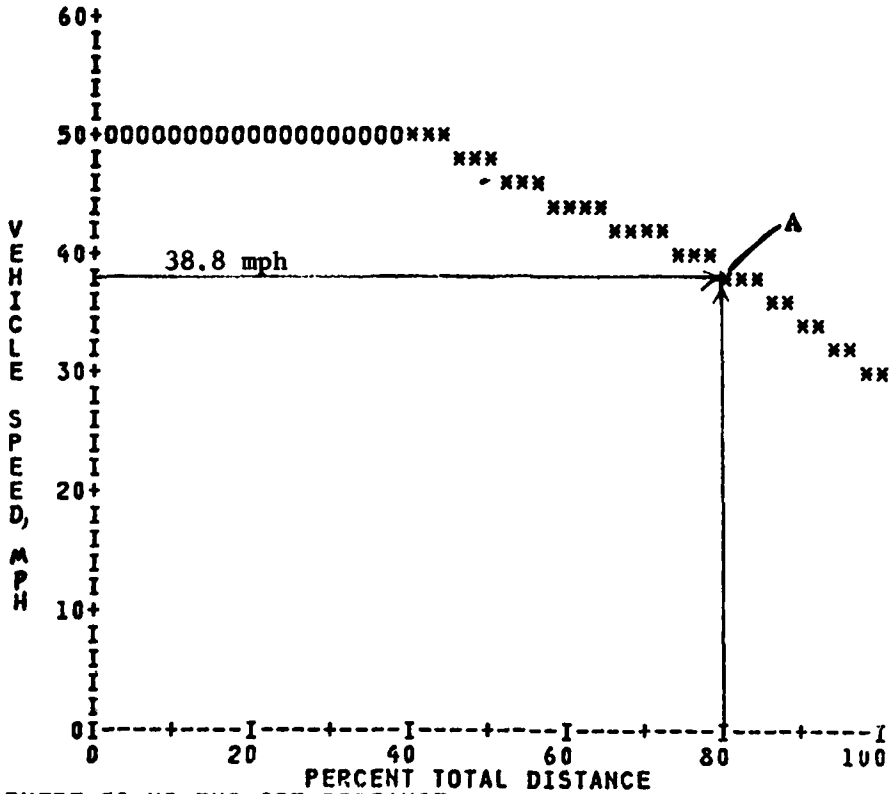
b. The mean time required to effect a single crossing, including engineer assistance where necessary.

32. The methodology, as applied, examined the WACROSS digitized linear feature data for the areas covered by eighteen 1-km by 22-km sample strips across the area depicted on the Lauterbach quad sheet (L5322). Nine samples defined north-south transects, and nine defined east-west transects. Moving from one end of each transect to the other, the computerized process avoids crossings where possible without going out of the transect bounds, and, where water crossings are unavoidable,

Dry Oct-Dec Normal

(Primary Roads Only)

Germany Quad-5520 Road Predictions (MICOM)
Vehicle 1




THERE IS NO "NO-GO" DISTANCE

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 50.0 | 50.0 | 50.0 | 50.0 | 50.0 |
| 1X | 50.0 | 50.0 | 50.0 | 50.0 | 50.0 |
| 2X | 50.0 | 50.0 | 50.0 | 50.0 | 50.0 |
| 3X | 50.0 | 50.0 | 50.0 | 50.0 | 50.0 |
| 4X | 49.9 | 49.5 | 49.0 | 48.4 | 47.8 |
| 5X | 47.3 | 46.8 | 46.2 | 45.6 | 44.9 |
| 6X | 44.3 | 43.7 | 43.2 | 42.7 | 42.3 |
| A 7X | 41.8 | 41.4 | 40.9 | 40.3 | 39.6 |
| 8X | 38.8 | 37.9 | 37.1 | 36.2 | 35.1 |
| 9X | 34.1 | 33.2 | 32.4 | 31.5 | 30.3 |
| 10X | 29.1 | | | | |

ACCUMULATED SPEED

Figure 5. Speed profile for primary roads

selects the optimum crossing site. A site at which the vehicle can successfully cross without assistance is chosen as the optimum site, if such a site exists. Otherwise, the site chosen requires a minimum of critical engineer resources (bulldozers, bridges, etc.) to prepare it for crossing. The construction time required is computed based upon site characteristics and added to an arbitrary waiting time of 1 hr. The mean time per crossing is given by: (total construction and waiting time for all crossings)/(total number of crossings). Since vehicles are rarely used in single-vehicle missions, the crossing time assessed a single vehicle is taken to be one-tenth of the computed value. This is equivalent to spreading the crossing "expense" among 10 vehicles.

33. The product of the mean time per crossing and the number of crossings per mile of off-road terrain traversed gives a water-crossing coefficient having units of hours per mile. This index provides a simple comparative measure of a vehicle's water-crossing ability. Table B22 in Appendix B presents the values for this coefficient for each vehicle in the Lauterbach, Mafraq, and Dasht-E Arzhan quads.

## Tactical Mobility Levels

34. The mobility performance of a vehicle is a complex function of the vehicle characteristics, the terrain in which it is operating, and the task it is required to do. Expressing mobility performance in a reduced set of meaningful numbers to aid in making decisions involves considerable sacrifice of detail.

35. The 1972 DA WHEELS Study qualitatively defined three levels of tactical mobility associated with three broadly stated mission profiles: tactical high, tactical standard, and tactical support. Table 2 (Nuttall and Randolph 1976) gives the WHEELS definitions, defines two added levels to complete the range, and quantifies the mission profile associated with the five resulting mobility levels in terms of three statistics:

a. Percentage of total mission travel which is off-road (on-road percentage is simply 100 percent minus off-road percentage).

b. Minimum percent of off-road terrain which must be negotiated.

c. Minimum percent of trails (and tertiary roads) which must be negotiated.

The quantified definitions permit calculation of a mean area-wide speed-made-good or rating speed for a vehicle in missions of each composition in stated seasonal conditions. The detailed procedure is given in Appendix C.

36. Other mission profiles may match perceived needs for a given vehicle type better than any of those in Table 2. The specific breakdown of expected operation between off- and on-road may differ between a highly developed country and an underdeveloped country, and it may be useful to further divide the percentage of operations on- and off-road according to road or terrain type. For the present study a special MICOM mission profile has been added to reflect the expected travel of the ROLAND transporter. In addition, on-road operations have been subdivided by road/trail type to reflect available relative mileages of each.

37. Table 3 gives the network composition and the percentage of primary roads, secondary roads, trails, and off-road challenged and the severity of operation associated with each for the five tactical mobility levels and the MICOM mobility levels for the Federal Republic of Germany and for Jordan and Iran.

38. Mobility rating speeds of the study vehicles at the tactical mobility levels and the MICOM mobility levels for the Lauterbach, Mafraq, and Dasht-E Arzhan quads are given in Tables B23-B25, respectively.

## PART IV: MOBILITY ASSESSMENT OF STUDY VEHICLES

39. Selected off-road performance data, on-road performance data, and performance data for a scenario containing both off- and on-road travel were used to compare:

a. The effects on mobility performance of the proposed ROLAND missile vehicle when speed is limited by ride dynamics at the driver's seat and when speed is limited by ride dynamics at the commander's seat.

b. The mobility performance of the proposed ROLAND missile vehicle equipped with 11.00 X20 tires with that of the same vehicle equipped with 14.00 X20 tires.

c. The mobility performance of the proposed ROLAND missile vehicle with that of several existing reference vehicles.

d. The mobility performance of the proposed ROLAND missile vehicle with the M977 ROLAND missile concept vehicle.

e. The effects of the mobility performance of the proposed ROLAND missile vehicle over a scenario requiring side slope operation and a scenario containing no side slope operation.

### Comparison of Mobility Performance of the Proposed ROLAND Missile Vehicle When Limited by Ride Dynamics Speed at Two Different Locations

40. Ride dynamics speed limits established from ride measurements at the driver's seat were used for the proposed ROLAND missile vehicle (Vehicle 1). Ride dynamics speed limits were also established from measurements at the commander's seat location and used in place of the normal driver's seat values to develop another set of mobility performance predictions (Vehicle 6). Selected off-road performance data, on-road performance data, and a scenario containing both off- and on-road performance data (MICOM mobility level) for Vehicles 1 and 6 are given in Tables 4, 5, and 6, respectively, for all the study surface conditions of each study area.

41. These data show that the $V_{100}$ speeds on secondary roads, $V_{100}$ speeds on trails, $V_{50}$ and $V_{80}$ speeds in off-road terrain, and mobility

rating speed at the MICOM mobility level are generally slightly lower for Vehicle 6 than for Vehicle 1. These slightly lower speeds reflect the slightly harsher ride at the commander's seat (Tables A4 and A5) than at the driver's seat.

## Comparison of the Mobility Performance of the Proposed ROLAND Missile Vehicle Equipped with 11.00 X20 Tires and the Same Vehicle Equipped with 14.00 X20 Tires

42. Selected off-road performance data, on-road performance data, and a scenario containing both off-road and on-road performance data (MICOM mobility level) for the ROLAND missile vehicle (Vehicle 1) equipped with 11.00 X20 tires (duals on rear axles) and the same vehicle (Vehicle 2) equipped with 14.00 X20 tires (duals on rear axles) are given in Tables 7, 8, and 9, respectively, for all study surface conditions of each study area.

43. These data show that fitting the ROLAND missile concept vehicle with the larger 14.00 X20 tires (Vehicle 2) significantly decreases the percent NOGO from that of the proposed ROLAND missile vehicle with the 11.00 X20 tires (Vehicle 1) during the wet normal and wet-wet slippery surface conditions of the Lauterbach quad and for the sand condition of the Mafraq quad. Equipping the ROLAND missile concept vehicle with 14.00 X20 tires (Vehicle 2) decreases its percent NOGO slightly for the dry and snow surface conditions of each of the study areas. Both tire sets (Vehicles 1 and 2) gave similar $V_{50}$ and $V_{80}$ speeds for the dry surface condition of each study area.

## Comparison of Mobility of Proposed ROLAND Missile Vehicle and Reference Vehicles

44. Selected off-road performance data, on-road performance data, and a scenario containing both off- and on-road performance data (MICOM mobility level) for the proposed ROLAND missile vehicle (Vehicle 1) and two reference vehicles (Vehicles 4 and 5) are given in Tables 10, 11, and 12, respectively, for all the study surface conditions of each study

area. The reference vehicles were the M813A1, 5-ton cargo truck (Vehicle 4) and the M109A1 (tracked) self-propelled howitzer.

45. These data show that the tracked M109A1 (Vehicle 5) had slightly higher speeds at $V_{100}$ on secondary roads and significantly higher $V_{100}$ on trails, $V_{50}$ and $V_{80}$ off-road, and mobility rating speeds at MICOM mobility levels for all surface conditions and study areas than either the proposed ROLAND missile vehicle (Vehicle 1) or the M813A1 (Vehicle 4). The M109A1 also had significantly less NOGO than the wheeled vehicles (Vehicles 1 and 4).

46. Compared to the M813A1 (Vehicle 4), the proposed ROLAND missile vehicle (Vehicle 1) had similar or slightly lower $V_{100}$ speeds on primary roads, $V_{100}$ speeds on secondary roads, $V_{50}$ and $V_{80}$ speeds off-road, and mobility rating speeds at MICOM mobility levels during the dry surface condition of all study quads and the wet-wet slippery and sand conditions of the Mafraq quad. The proposed ROLAND missile vehicle had significantly lower $V_{100}$ on trails, $V_{50}$ and $V_{80}$ off-road, and mobility rating speeds at the MICOM mobility level, and significantly higher percent NOGO on trails and off-road during the wet normal and wet-wet slippery conditions of the Lauterbach quad.

## Comparison of the Proposed ROLAND Missile Vehicle and the M977 ROLAND Missile Concept Vehicle

47. Selected off-road performance data, on-road performance data, and a scenario containing both off- and on-road performance data (MICOM mobility level) for the proposed ROLAND missile vehicle (Vehicle 1) and the M977 ROLAND missile concept vehicle (Vehicle 3) are given in Tables 13, 14, and 15, respectively, for all study surface conditions of each study area.

48. These data show that the proposed ROLAND missile vehicle and the M977 ROLAND missile concept vehicle have similar $V_{100}$ speeds on primary roads. For most surface conditions and study quads, the M977 ROLAND missile concept vehicle has significantly higher $V_{100}$ speeds on secondary roads, $V_{100}$ speeds on trails, and $V_{50}$ and $V_{80}$ speeds off-road

and significantly lower percent NOGO on trails and off-road than the proposed ROLAND missile vehicle. The M977 ROLAND missile concept vehicle's greatest increase in mobility over that of the proposed ROLAND missile concept vehicle is in the reduced percent NOGO off-road for all surface conditions and quads.

## Comparison of the Mobility of Study Vehicles over Scenarios with and without Side Slope Operation

49. The percent NOGO for each study surface condition for the study vehicles of the Lauterbach quad without side slope operations (standard scenario used in other portions of this study) and for a special scenario requiring side slope operations are given in Table 16. These data show the increase in percent NOGO due to required side slope operation.

50. The M109A1 (Vehicle 5) had significantly lower NOGOs with and without side slope operations during all surface conditions than any of the other study vehicles. The M812A1 ROLAND missile concept vehicle (Vehicle 2) with 14.00 X20 tires had significantly lower percent NOGO than the proposed ROLAND missile vehicle (Vehicle 1) with 11.00 X20 tires during the wet normal and wet-wet slippery surface conditions.

51. The M977 ROLAND missile concept vehicle (Vehicle 3) had significantly lower percent NOGO than the proposed ROLAND missile vehicle (Vehicle 1) with and without side slope operations during the dry, wet normal, and wet-wet slippery surface conditions.

52. The M813A1 (Vehicle 4) had significantly lower percent NOGO for the scenario requiring no side slope operations during the wet normal and wet-wet slippery conditions than the proposed ROLAND missile vehicle (Vehicle 1), the M977 ROLAND missile concept vehicle (Vehicle 3), and the M812A1 ROLAND missile concept vehicle (Vehicle 2), but only slightly less NOGO than the same vehicles for scenarios requiring side slope operations.

53. The increase in percent NOGO for scenarios requiring side slope operations over that for scenarios requiring no side slope

operations was relatively low. The reason for the increase being small is that the standard scenario with no side slope operation requires upslope operation, which results in NOGO performance for most of the same slopes that were NOGO when side slope performance is required.

## PART V: SUMMARY ASSESSMENT

54. Based on the discussion of data presented in Part IV, the following summary assessment is made:

a. On the ROLAND missile vehicle, the ride comfort at the commander's seat is slightly worse than the ride comfort at the driver's seat, which results in slightly lower mobility speeds both off- and on-road for most study surface conditions of the study quads.

b. The use of 14.00 X20 tires instead of 11.00 X20 tires on the proposed ROLAND missile vehicle would significantly decrease the percent NOGO during the wet normal and wet-wet slippery surface conditions in the Lauterbach quad and for the sand surface condition in the Mafraq quad. The reduced percent NOGO is due to the lower $VCI_1$ of the vehicle with the larger tires (Table 1).

c. The proposed ROLAND missile vehicle has on- and off-road mobility performance equal to or slightly lower than that of the M813A1 5-ton cargo truck for the dry surface condition of all study quads, the sand surface condition in the Mafraq quad, and the snow surface condition of the Lauterbach quad.

d. The proposed ROLAND missile vehicle has significantly more NOGO than the M813A1 5-ton cargo truck off-road during the wet normal or wet-wet slippery surface conditions in the Lauterbach quad.

e. The proposed ROLAND missile vehicle has similar mobility performance on primary roads to the M977 ROLAND missile concept vehicle but has significantly lower mobility performance on secondary roads, trails, and off-road for most study surface conditions of the study quads.

f. The proposed ROLAND missile vehicle has better mobility performance on primary roads but significantly lower mobility on secondary roads, trails, and off-road than the M109A1 for all study surface conditions of the study quads.

g. Scenarios for the ROLAND missile vehicle requiring side slope operations result in about 10 percent more NOGO during the wet normal and wet-wet slippery surface conditions of the Lauterbach quad, 5 percent more NOGO during the dry surface condition, and 1 percent more NOGO during the snow surface condition than those requiring no side slope operations.

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Table 1

Important Characteristics of Study Vehicles

| Vehicle | Tire Size or Track Width, in. | Wheelbase, in. or Track Length, in. | Gross Vehicle Weight, lb | Power-to-Weight Ratio | Minimum Ground Clearance in. | Approach Angle deg | Departure Angle deg | $VCI_1$ (Fine-grained) | Max Speed mph | Speed (mph) for Obstacle Height (in.) at 2.5 g's | | | 6-Watt Speeds for Indicated rms Elevation, mph | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | 6 | 8 | 10 | 1.0 | 1.5 | 2.0 |
| 1 | 11.00 X20 | 215 | 50,239 | 10.0 | 10.2 | 46 | 29.0 | 56 | 50 | 30.2 | 8.4 | 6.0 | 9.1 | 8.0 | 8.0 |
| 2 | 14.00 X20 | 215 | 50,739 | 9.8 | 12.2 | 48 | 31.0 | 39 | 55 | 30.2 | 8.4 | 6.0 | 9.1 | 8.0 | 8.0 |
| 3 | 16.00 R20 | 210 | 65,776 | 12.2 | 13.4 | 43 | 45.0 | 40 | 60 | 55.0 | 18.3 | 3.5 | 16.0 | 10.5 | 7.5 |
| 4 | 11.00 X20 | 179 | 32,080 | 15.6 | 11.5 | 46 | 32.5 | 33 | 50 | 30.2 | 5.0 | 4.4 | 9.1 | 8.0 | 8.0 |
| 5 | 15.0 | 156 | 53,060 | 15.7 | 17.7 | 75 | 80.5 | 25 | 32 | 60.0 | 60.0 | 13.0 | 30.0 | 19.0 | 16.0 |
| 6 | 11.00 X20 | 215 | 50,239 | 10.0 | 10.2 | 46 | 29.0 | 56 | 50 | 60.0 | 12.0 | 6.0 | 8.2 | 7.6 | 7.2 |

Table 2

Preliminary Quantification of WHEELS Study Definitions of Tactical Mobility*

| Mobility Level | Operating Distance | | Severity of Operation | |
|---|---|---|---|---|
| | Off-Road Percent | On-Road Percent | Off-Road** Percent of Terrain Challenged | On-Road Percent of Trails Challenged |
| **High-high mobility†** | | | | |
| All off-road operation. | 100 | 0 | 100 | -- |
| **Tactical high mobility** | | | | |
| The highest level of mobility designating the requirement for extensive cross-country maneuverability characteristic of operations in the ground-gaining and fire-support environment. | 50 | 50 | 90 | 100 |
| **Tactical standard mobility** | | | | |
| The second highest level of mobility designating the requirement for occasional cross-country movement. | 15 | 85 | 80 | 100 |
| **Tactical support mobility** | | | | |
| A level of mobility designating the requirement for infrequent off-road operations over selected terrain with the preponderance of movement on primary and secondary roads. | 5 | 95 | 50 | 50 |
| **On-road mobility†** | | | | |
| All on superhighways, primary and secondary roads, and the best tertiary roads and trails. | 0 | 100 | -- | 10 |

* From U. S. Army Engineer Waterways Experiment Station and U. S. Army Tank-Automotive Command (1972).

** In terms of percentage of best off-road terrain to be challenged (off-road speed profile).

† Not a WHEELS Study definition, but added during HIMO Study to yield a continuum from all off-road to all on-road.

Table 3

Network Composition and Severity at Tactical Mobility Levels for the Federal Republic of Germany and Jordan and Iran Study Areas

| Mobility Levels | Composition of Network in Percent | | | | Severity of Operation in Terms of Percent of Terrain and Roads Challenged* | | | |
|---|---|---|---|---|---|---|---|---|
| | Primary Roads ($P_P$)** | Secondary Roads ($P_S$) | Trails ($P_T$) | Off-Road (P) | Primary Roads ($V_{PP}$) | Secondary Roads ($V_{SP}$) | Trails ($V_{TP}$) | Off-Road ($V_C$) |
| **Federal Republic of Germany** | | | | | | | | |
| High-High | 0 | 0 | 0 | 100 | -- | -- | -- | $V_{100}$ |
| Tactical High | 10 | 30 | 10 | 50 | $V_{100}$ | $V_{100}$ | $V_{100}$ | $V_{90}$ |
| Tactical Standard | 20 | 50 | 15 | 15 | $V_{100}$ | $V_{100}$ | $V_{100}$ | $V_{80}$ |
| Tactical Support | 30 | 55 | 10 | 5 | $V_{100}$ | $V_{100}$ | $V_{50}$ | $V_{50}$ |
| On-Road | 35 | 60 | 5 | 0 | $V_{100}$ | $V_{100}$ | $V_{10}$ | -- |
| MICOM | 20 | 50 | 15 | 15 | $V_{100}$ | $V_{100}$ | $V_{50}$ | $V_{50}$ |
| **Jordan and Iran** | | | | | | | | |
| High-High | 0 | 0 | 0 | 100 | -- | -- | -- | $V_{100}$ |
| Tactical High | 5 | 20 | 25 | 50 | $V_{100}$ | $V_{100}$ | $V_{100}$ | $V_{90}$ |
| Tactical Standard | 15 | 35 | 35 | 15 | $V_{100}$ | $V_{100}$ | $V_{100}$ | $V_{80}$ |
| Tactical Support | 20 | 40 | 35 | 5 | $V_{100}$ | $V_{100}$ | $V_{80}$ | $V_{50}$ |
| On-Road | 30 | 40 | 30 | 0 | $V_{100}$ | $V_{100}$ | $V_{50}$ | -- |
| MICOM | 15 | 35 | 35 | 15 | $V_{100}$ | $V_{100}$ | $V_{50}$ | $V_{50}$ |

* Percent of terrain challenged refers to the average speed of the vehicle over a given percent of the best terrain. For instance, $V_{90}$ means that speed of the vehicle negotiating 90 percent of the terrain with the higher speeds and avoiding the 10 percent of the terrain with the lowest speeds.

** See paragraphs 1 and 2 in Appendix C of this report for description of the terms in parentheses.

Table 4

Off-Road Mobility Performance Data for the Proposed ROLAND Missile Vehicle When Controlled by Ride Dynamics at the Driver's Seat (Vehicle 1) and When Controlled by Ride Dynamics at the Commander's Seat (Vehicle 6)

| | Lauterbach Quad | | | Mafraq Quad | | | Dasht-E Arzhan Quad | | |
|---|---|---|---|---|---|---|---|---|---|
| Vehicles | $V_{50}$ mph | $V_{80}$ mph | Percent NOGO | $V_{50}$ mph | $V_{80}$ mph | Percent NOGO | $V_{50}$ mph | $V_{80}$ mph | Percent NOGO |
| | | | | Dry Condition | | | | | |
| 1 | 11.4 | 8.6 | 15.0 | 9.3 | 8.5 | 12.0 | 7.1 | 0.3 | 44.5 |
| 6 | 10.1 | 7.9 | 15.0 | 8.2 | 7.6 | 12.0 | 6.8 | 0.3 | 44.5 |
| | | | | Wet Normal Condition | | | | | |
| 1 | 0.3 | 0.2 | 69.1 | -- | -- | -- | -- | -- | -- |
| 6 | 0.3 | 0.2 | 69.1 | -- | -- | -- | -- | -- | -- |
| | | | | Wet-Wet Slippery Condition | | | | | |
| 1 | 0.2 | 0.1 | 74.6 | 9.2 | 8.0 | 19.2 | -- | -- | -- |
| 6 | 0.2 | 0.1 | 74.6 | 8.1 | 7.2 | 19.2 | -- | -- | -- |
| | | | | Snow Condition | | | | | |
| 1 | 5.4 | 0.9 | 26.6 | -- | -- | -- | -- | -- | -- |
| 6 | 5.3 | 0.9 | 26.6 | -- | -- | -- | -- | -- | -- |
| | | | | Sand Condition | | | | | |
| 1 | -- | -- | -- | 8.7 | 1.0 | 26.9 | -- | -- | -- |
| 6 | -- | -- | -- | 7.9 | 1.0 | 26.9 | -- | -- | -- |

Table 5

On-Road Mobility Performance for the Proposed ROLAND Missile Vehicle When Controlled by Ride Dynamics at the Driver's Seat (Vehicle 1) and When Controlled by Ride Dynamics at the Commander's Seat (Vehicle 6)

| Vehicles | Lauterbach Quad | | | | Mafraq Quad | | | | Dasht-E Arzhan Quad | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Primary Roads | Secondary Roads | Trails | | Primary Roads | Secondary Roads | Trails | | Primary Roads | Secondary Roads | Trails | |
| | $V_{100}$ mph | $V_{100}$ mph | $V_{100}$ mph | Percent NOGO | $V_{100}$ mph | $V_{100}$ mph | $V_{100}$ mph | Percent NOGO | $V_{100}$ mph | $V_{100}$ mph | $V_{100}$ mph | Percent NOGO |
| **Dry Condition** | | | | | | | | | | | | |
| 1 | 29.1 | 16.9 | 8.0 | 0 | 32.2 | 18.0 | 8.2 | 0 | -- | 14.8 | 8.8 | 0 |
| 6 | 29.1 | 14.7 | 7.3 | 0 | 32.2 | 15.1 | 7.5 | 0 | -- | 11.7 | 8.0 | 0 |
| **Wet Normal Condition** | | | | | | | | | | | | |
| 1 | 29.1 | 16.9 | 3.6 | 1.5 | -- | -- | -- | -- | -- | -- | -- | -- |
| 6 | 29.1 | 14.7 | 3.5 | 1.5 | -- | -- | -- | -- | -- | -- | -- | -- |
| **Wet-Wet Slippery Condition** | | | | | | | | | | | | |
| 1 | 28.2 | 16.7 | 3.5 | 1.5 | 30.5 | 17.8 | 7.9 | 0 | -- | -- | -- | -- |
| 6 | 28.2 | 14.5 | 3.4 | 1.5 | 30.5 | 15.0 | 7.3 | 0 | -- | -- | -- | -- |
| **Snow Condition** | | | | | | | | | | | | |
| 1 | 23.4 | 15.4 | 5.1 | 0 | -- | -- | -- | -- | -- | -- | -- | -- |
| 6 | 23.4 | 13.5 | 5.1 | 0 | -- | -- | -- | -- | -- | -- | -- | -- |
| **Sand Condition** | | | | | | | | | | | | |
| 1 | -- | -- | -- | -- | 29.8 | 17.8 | 0.6 | 14.7 | -- | -- | -- | -- |
| 6 | -- | -- | -- | -- | 29.8 | 15.0 | 0.6 | 14.7 | -- | -- | -- | -- |

Table 6

Mobility Rating Speed for Proposed ROLAND Missile Vehicle When Controlled by Ride Dynamics at the Driver's Seat (Vehicle 1) and When Controlled by Ride Dynamics at the Commander's Seat (Vehicle 6)

| Vehicles | Lauterbach Quad, mph | Mafraq Quad, mph | Dasht-E Arzhan Quad, mph |
|---|---|---|---|
| | | Dry Condition | |
| 1 | 12.1 | 11.6 | 10.5 |
| 6 | 11.1 | 10.4 | 9.0 |
| | | Wet Normal Condition | |
| 1 | 1.8 | -- | -- |
| 6 | 1.7 | -- | -- |
| | | Wet-Wet Slippery Condition | |
| 1 | 1.2 | 11.3 | -- |
| 6 | 1.2 | 10.1 | -- |
| | | Snow Condition | |
| 1 | 9.1 | -- | -- |
| 6 | 8.7 | -- | -- |
| | | Sand Condition | |
| 1 | -- | 11.1 | -- |
| 6 | -- | 10.1 | -- |

Table 7

Off-Road Mobility Performance Data for the Proposed ROLAND Missile Vehicle (Vehicle 1) and ROLAND Missile Concept Vehicle (Vehicle 2)

| Vehicles | Lauterbach Quad | | | Mafraq Quad | | | Dasht-E Arzhan Quad | | |
|---|---|---|---|---|---|---|---|---|---|
| | $V_{50}$ mph | $V_{80}$ mph | Percent NOGO | $V_{50}$ mph | $V_{80}$ mph | Percent NOGO | $V_{50}$ mph | $V_{80}$ mph | Percent NOGO |
| | | | | Dry Condition | | | | | |
| 1 | 11.4 | 8.6 | 15.0 | 9.3 | 8.5 | 12.0 | 7.0 | 0.3 | 44.5 |
| 2 | 11.4 | 8.6 | 13.6 | 9.3 | 8.5 | 10.3 | 7.1 | 0.3 | 43.1 |
| | | | | Wet Normal Condition | | | | | |
| 1 | 0.3 | 0.2 | 69.1 | -- | -- | -- | -- | -- | -- |
| 2 | 6.1 | 0.3 | 44.6 | -- | -- | -- | -- | -- | -- |
| | | | | Wet-Wet Slippery Condition | | | | | |
| 1 | 0.2 | 0.1 | 74.6 | 9.2 | 8.0 | 19.2 | -- | -- | -- |
| 2 | 0.4 | 0.2 | 61.7 | 9.2 | 8.2 | 12.2 | -- | -- | -- |
| | | | | Snow Condition | | | | | |
| 1 | 5.4 | 0.9 | 26.6 | -- | -- | -- | -- | -- | -- |
| 2 | 5.7 | 1.3 | 24.5 | -- | -- | -- | -- | -- | -- |
| | | | | Sand Condition | | | | | |
| 1 | -- | -- | -- | 8.7 | 1.0 | 26.9 | -- | -- | -- |
| 2 | -- | -- | -- | 8.5 | 7.2 | 18.4 | -- | -- | -- |

Table 8

On-Road Mobility Performance for the Proposed ROLAND Missile Vehicle (Vehicle 1) and ROLAND Missile Concept Vehicle (Vehicle 2)

| Vehicles | Lauterbach Quad | | | | Mafraq Quad | | | | Dasht-E Arzhan Quad | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Primary Roads | Secondary Roads | Trails | | Primary Roads | Secondary Roads | Trails | | Primary Roads | Secondary Roads | Trails | |
| | $V_{100}$ mph | $V_{100}$ mph | $V_{100}$ mph | Percent NOGO | $V_{100}$ mph | $V_{100}$ mph | $V_{100}$ mph | Percent NOGO | $V_{100}$ mph | $V_{100}$ mph | $V_{100}$ mph | Percent NOGO |
| **Dry Condition** | | | | | | | | | | | | |
| 1 | 29.1 | 16.9 | 8.0 | 0 | 32.2 | 18.0 | 8.2 | 0 | -- | 14.8 | 8.8 | 0 |
| 2 | 28.9 | 17.1 | 8.0 | 0 | 33.4 | 18.1 | 8.2 | 0 | -- | 14.7 | 8.8 | 0 |
| **Wet Normal Condition** | | | | | | | | | | | | |
| 1 | 29.1 | 16.9 | 3.6 | 1.5 | -- | -- | -- | -- | -- | -- | -- | -- |
| 2 | 28.9 | 17.1 | 7.9 | 0 | -- | -- | -- | -- | -- | -- | -- | -- |
| **Wet-Wet Slippery Condition** | | | | | | | | | | | | |
| 1 | 28.2 | 16.7 | 3.5 | 1.5 | 30.5 | 17.8 | 7.9 | 0 | -- | -- | -- | -- |
| 2 | 28.0 | 16.8 | 3.5 | 1.5 | 31.5 | 17.8 | 7.9 | 0 | -- | -- | -- | -- |
| **Snow Condition** | | | | | | | | | | | | |
| 1 | 23.4 | 15.4 | 5.1 | 0 | -- | -- | -- | -- | -- | -- | -- | -- |
| 2 | 22.8 | 15.4 | 5.7 | 0 | -- | -- | -- | -- | -- | -- | -- | -- |
| **Sand Condition** | | | | | | | | | | | | |
| 1 | -- | -- | -- | -- | 29.8 | 17.8 | 0.6 | 14.7 | -- | -- | -- | -- |
| 2 | -- | -- | -- | -- | 30.8 | 17.8 | 0.7 | 12.6 | -- | -- | -- | -- |

Table 9

Mobility Rating Speed at MICOM Mobility Level for Proposed ROLAND Missile Vehicle (Vehicle 1) and ROLAND Missile Concept Vehicle (Vehicle 2)

| Vehicles | Lauterbach Quad, mph | Mafraq Quad, mph | Dasht-E Arzhan Quad, mph |
|---|---|---|---|
| | | Dry Condition | |
| 1 | 12.1 | 11.6 | 10.5 |
| 2 | 12.3 | 11.7 | 10.5 |
| | | Wet Normal Condition | |
| 1 | 1.8 | -- | -- |
| 2 | 10.6 | -- | -- |
| | | Wet-Wet Slippery Condition | |
| 1 | 1.2 | 11.3 | -- |
| 2 | 2.2 | 11.4 | -- |
| | | Snow Condition | |
| 1 | 9.1 | -- | -- |
| 2 | 9.4 | -- | -- |
| | | Sand Condition | |
| 1 | -- | 11.1 | -- |
| 2 | -- | 11.2 | -- |

Table 10

Off-Road Mobility Performance Data for the Proposed ROLAND Missile Vehicle (Vehicle 1) and Selected Reference Vehicles (Vehicles 4 and 5)

| Vehicles | Lauterbach Quad | | | Mafraq Quad | | | Dasht-E Arzhan Quad | | |
|---|---|---|---|---|---|---|---|---|---|
| | $V_{50}$ mph | $V_{80}$ mph | Percent NOGO | $V_{50}$ mph | $V_{80}$ mph | Percent NOGO | $V_{50}$ mph | $V_{80}$ mph | Percent NOGO |
| | | | | Dry Condition | | | | | |
| 1 | 11.4 | 8.6 | 15.0 | 9.3 | 8.5 | 12.0 | 7.1 | 0.3 | 44.5 |
| 4 | 12.1 | 9.2 | 7.6 | 9.4 | 8.7 | 5.2 | 8.0 | 0.5 | 33.7 |
| 5 | 16.1 | 11.5 | 2.9 | 19.0 | 15.8 | 0.5 | 13.3 | 6.4 | 19.4 |
| | | | | Wet Normal Condition | | | | | |
| 1 | 0.3 | 0.2 | 69.1 | -- | -- | -- | -- | -- | -- |
| 4 | 9.5 | 6.5 | 19.6 | -- | -- | -- | -- | -- | -- |
| 5 | 10.9 | 8.2 | 5.7 | -- | -- | -- | -- | -- | -- |
| | | | | Wet-Wet Slippery Condition | | | | | |
| 1 | 0.2 | 0.1 | 74.6 | 9.2 | 8.0 | 19.2 | -- | -- | -- |
| 4 | 8.2 | 0.6 | 33.1 | 9.3 | 8.6 | 6.4 | -- | -- | -- |
| 5 | 10.0 | 7.6 | 8.8 | 16.9 | 14.1 | 0.8 | -- | -- | -- |
| | | | | Snow Condition | | | | | |
| 1 | 5.4 | 0.9 | 26.6 | -- | -- | -- | -- | -- | -- |
| 4 | 7.9 | 1.5 | 23.8 | -- | -- | -- | -- | -- | -- |
| 5 | 14.9 | 10.1 | 15.0 | -- | -- | -- | -- | -- | -- |
| | | | | Sand Condition | | | | | |
| 1 | -- | -- | -- | 8.7 | 1.0 | 26.9 | -- | -- | -- |
| 4 | -- | -- | -- | 9.0 | 1.2 | 25.7 | -- | -- | -- |
| 5 | -- | -- | -- | 12.6 | 10.8 | 0.7 | -- | -- | -- |

Table 11

On-Road Mobility Performance Data for the Proposed ROLAND Missile Vehicle (Vehicle 1) and Selected Reference Vehicles (Vehicles 4 and 5)

| Vehicles | Lauterbach Quad | | | | Mafraq Quad | | | | Dasht-E Arzhan Quad | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Primary Roads $V_{100}$ mph | Secondary Roads $V_{100}$ mph | Trails $V_{100}$ mph | Trails Percent NOGO | Primary Roads $V_{100}$ mph | Secondary Roads $V_{100}$ mph | Trails $V_{100}$ mph | Trails Percent NOGO | Primary Roads $V_{100}$ mph | Secondary Roads $V_{100}$ mph | Trails $V_{100}$ mph | Trails Percent NOGO |
| **Dry Condition** | | | | | | | | | | | | |
| 1 | 29.1 | 16.9 | 8.0 | 0 | 32.2 | 18.0 | 8.2 | 0 | -- | 14.8 | 8.8 | 0 |
| 4 | 30.5 | 18.2 | 8.1 | 0 | 34.2 | 18.0 | 8.3 | 0 | -- | 14.5 | 8.9 | 0 |
| 5 | 23.5 | 20.1 | 13.8 | 0 | 24.1 | 23.9 | 15.4 | 0 | -- | 18.7 | 17.5 | 0 |
| **Wet Normal Condition** | | | | | | | | | | | | |
| 1 | 29.1 | 16.9 | 3.6 | 1.5 | -- | -- | -- | -- | -- | -- | -- | -- |
| 4 | 30.5 | 18.2 | 8.0 | 0 | -- | -- | -- | -- | -- | -- | -- | -- |
| 5 | 23.5 | 20.1 | 12.5 | 0 | -- | -- | -- | -- | -- | -- | -- | -- |
| **Wet-Wet Slippery Condition** | | | | | | | | | | | | |
| 1 | 28.2 | 16.7 | 3.5 | 1.5 | 30.5 | 17.8 | 7.9 | 0 | -- | -- | -- | -- |
| 4 | 29.5 | 17.9 | 7.7 | 0 | 32.2 | 17.9 | 8.2 | 0 | -- | -- | -- | -- |
| 5 | 23.0 | 19.8 | 11.8 | 0 | 23.3 | 23.6 | 13.1 | 0 | -- | -- | -- | -- |
| **Snow Condition** | | | | | | | | | | | | |
| 1 | 23.4 | 15.4 | 5.1 | 0 | -- | -- | -- | -- | -- | -- | -- | -- |
| 4 | 24.2 | 16.3 | 7.2 | 0 | -- | -- | -- | -- | -- | -- | -- | -- |
| 5 | 21.0 | 18.1 | 12.6 | 0 | -- | -- | -- | -- | -- | -- | -- | -- |
| **Sand Condition** | | | | | | | | | | | | |
| 1 | -- | -- | -- | -- | 29.8 | 17.8 | 0.6 | 14.7 | -- | -- | -- | -- |
| 4 | -- | -- | -- | -- | 31.4 | 17.9 | 0.6 | 15.5 | -- | -- | -- | -- |
| 5 | -- | -- | -- | -- | 23.0 | 23.6 | 10.5 | 0 | -- | -- | -- | -- |

Table 12

Mobility Rating Speed at MICOM Mobility Level for Proposed ROLAND Missile Vehicle (Vehicle 1) and Selected Reference Vehicles (Vehicles 4 and 5)

| Vehicles | Lauterbach Quad, mph | Mafraq Quad, mph | Dasht-E Arzhan Quad, mph |
|---|---|---|---|
| | | Dry Condition | |
| 1 | 12.1 | 11.6 | 10.5 |
| 4 | 12.7 | 12.1 | 11.0 |
| 5 | 17.5 | 20.1 | 18.1 |
| | | Wet Normal Condition | |
| 1 | 1.8 | -- | -- |
| 4 | 12.0 | -- | -- |
| 5 | 15.8 | -- | -- |
| | | Wet-Wet Slippery Condition | |
| 1 | 1.2 | 11.3 | -- |
| 4 | 11.6 | 11.8 | -- |
| 5 | 15.3 | 17.7 | -- |
| | | Snow Condition | |
| 1 | 9.1 | -- | -- |
| 4 | 10.9 | -- | -- |
| 5 | 16.1 | -- | -- |
| | | Sand Condition | |
| 1 | -- | 11.1 | -- |
| 4 | -- | 11.8 | -- |
| 5 | -- | 16.1 | -- |

Table 13

Off-Road Mobility Performance Data for the Proposed ROLAND Missile Vehicle (Vehicle 1) and an M977 Modified ROLAND Missile Concept Vehicle (Vehicle 3)

| Vehicles | Lauterbach Quad | | | Mafraq Quad | | | Dasht-E Arzhan | | |
|---|---|---|---|---|---|---|---|---|---|
| | $V_{50}$ mph | $V_{80}$ mph | Percent NOGO | $V_{50}$ mph | $V_{80}$ mph | Percent NOGO | $V_{50}$ mph | $V_{80}$ mph | Percent NOGO |
| | | | | Dry Condition | | | | | |
| 1 | 11.4 | 8.6 | 15.0 | 9.3 | 8.5 | 12.0 | 7.1 | 0.3 | 44.5 |
| 3 | 16.6 | 10.4 | 7.3 | 14.8 | 10.9 | 2.0 | 10.8 | 0.7 | 30.2 |
| | | | | Wet Normal Condition | | | | | |
| 1 | 0.3 | 0.2 | 69.1 | -- | -- | -- | -- | -- | -- |
| 3 | 7.0 | 0.3 | 48.5 | -- | -- | -- | -- | -- | -- |
| | | | | Wet-Wet Slippery Condition | | | | | |
| 1 | 0.2 | 0.1 | 74.6 | 9.2 | 8.0 | 19.2 | -- | -- | -- |
| 3 | 0.4 | 0.2 | 61.7 | 13.9 | 10.2 | 4.3 | -- | -- | -- |
| | | | | Snow Condition | | | | | |
| 1 | 5.4 | 0.9 | 26.6 | -- | -- | -- | -- | -- | -- |
| 3 | 12.9 | 8.4 | 17.0 | -- | -- | -- | -- | -- | -- |
| | | | | Sand Condition | | | | | |
| 1 | -- | -- | -- | 8.7 | 1.0 | 26.9 | -- | -- | -- |
| 3 | -- | -- | -- | 11.6 | 8.8 | 11.5 | -- | -- | -- |

Table 14

On-Road Mobility Performance Data for the Proposed ROLAND Missile Vehicle (Vehicle 1) and an M977 Modified ROLAND Missile Concept Vehicle (Vehicle 3)

| Vehicles | Lauterbach Quad | | | | Mafraq Quad | | | | Dasht-E Arzhan Quad | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Primary Roads $V_{100}$ mph | Secondary Roads $V_{100}$ mph | Trails $V_{100}$ mph | Trails Percent NOGO | Primary Roads $V_{100}$ mph | Secondary Roads $V_{100}$ mph | Trails $V_{100}$ mph | Trails Percent NOGO | Primary Roads $V_{100}$ mph | Secondary Roads $V_{100}$ mph | Trails $V_{100}$ mph | Trails Percent NOGO |
| **Dry Condition** | | | | | | | | | | | | |
| 1 | 29.1 | 16.9 | 8.0 | 0 | 32.2 | 18.0 | 8.2 | 0 | -- | 14.8 | 8.8 | 0 |
| 3 | 29.3 | 21.9 | 8.7 | 0 | 31.8 | 23.9 | 9.5 | 0 | -- | 18.6 | 11.7 | 0 |
| **Wet Normal Condition** | | | | | | | | | | | | |
| 1 | 29.1 | 16.9 | 3.6 | 1.5 | -- | -- | -- | -- | -- | -- | -- | -- |
| 3 | 29.3 | 21.9 | 8.5 | 0 | -- | -- | -- | -- | -- | -- | -- | -- |
| **Wet-Wet Slippery Condition** | | | | | | | | | | | | |
| 1 | 28.2 | 16.7 | 3.5 | 1.5 | 30.5 | 17.8 | 7.9 | 0 | -- | -- | -- | -- |
| 3 | 28.4 | 21.4 | 3.7 | 1.5 | 30.1 | 23.6 | 9.1 | 0 | -- | -- | -- | -- |
| **Snow Condition** | | | | | | | | | | | | |
| 1 | 23.4 | 15.4 | 5.1 | 0 | -- | -- | -- | -- | -- | -- | -- | -- |
| 3 | 23.7 | 19.0 | 8.2 | 0 | -- | -- | -- | -- | -- | -- | -- | -- |
| **Sand Condition** | | | | | | | | | | | | |
| 1 | -- | -- | -- | -- | 29.8 | 17.8 | 0.6 | 14.7 | -- | -- | -- | -- |
| 3 | -- | -- | -- | -- | 29.5 | 23.6 | 0.7 | 12.6 | -- | -- | -- | -- |

Table 15

Mobility Rating Speed at MICOM Mobility Level for the Proposed ROLAND Missile Concept Vehicle (Vehicle 1) and an M977 Modified ROLAND Missile Concept Vehicle (Vehicle 3)

| Vehicles | Lauterbach Quad, mph | Mafraq Quad, mph | Dasht-E Arzhan Quad, mph |
|---|---|---|---|
| | | Dry Condition | |
| 1 | 12.1 | 11.6 | 10.5 |
| 3 | 15.2 | 17.4 | 15.5 |
| | | Wet Normal Condition | |
| 1 | 1.8 | -- | -- |
| 3 | 12.5 | -- | -- |
| | | Wet-Wet Slippery Condition | |
| 1 | 1.2 | 11.3 | -- |
| 3 | 2.3 | 16.3 | -- |
| | | Snow Condition | |
| 1 | 9.1 | -- | -- |
| 3 | 13.3 | -- | -- |
| | | Sand Condition | |
| 1 | -- | 11.1 | -- |
| 3 | -- | 15.1 | -- |

Table 16

Comparison of Percent NOGO for Study Vehicles Over Scenarios With and Without Side Slope Operations for the Lauterbach Quad in the Federal Republic of Germany

| Vehicle No. | Percent NOGO: Scenarios Without Side Slope Operations | Percent NOGO: Scenarios With Side Slope Operations |
|---|---|---|
| | Dry Condition | |
| 1 | 16.1 | 22.0 |
| 2 | 15.1 | 19.0 |
| 3 | 7.4 | 16.9 |
| 4 | 7.8 | 12.4 |
| 5 | 2.9 | 3.2 |
| 6 | 16.1 | 21.9 |
| | Wet Normal Condition | |
| 1 | 69.1 | 79.6 |
| 2 | 44.7 | 67.3 |
| 3 | 48.4 | 55.3 |
| 4 | 19.6 | 53.1 |
| 5 | 5.6 | 7.3 |
| 6 | 67.1 | 77.6 |
| | Wet-Wet Slippery Condition | |
| 1 | 74.6 | 84.3 |
| 2 | 61.6 | 73.6 |
| 3 | 61.7 | 64.5 |
| 4 | 33.1 | 59.2 |
| 5 | 8.8 | 10.8 |
| 6 | 74.6 | 84.3 |
| | Snow Condition | |
| 1 | 26.6 | 27.5 |
| 2 | 24.5 | 25.0 |
| 3 | 17.0 | 18.2 |
| 4 | 23.9 | 24.6 |
| 5 | 14.9 | 15.0 |
| 6 | 26.6 | 27.5 |

# APPENDIX A: DATA USED TO CHARACTERIZE STUDY VEHICLES AND A BRIEF DESCRIPTION OF FACTORS USED IN DESCRIBING STUDY AREAS IN THE FEDERAL REPUBLIC OF GERMANY, JORDAN, AND IRAN

## Vehicle Characteristics and Performance Data

1. Extensive data are required to characterize a vehicle to predict its performance with the AMM and SWIMCRIT/WACROSS water-crossing models. These data for the six study vehicles are given in Tables A1-A5.

## Terrain Data

2. A detailed description of the procedures used to describe the study areas in the Federal Republic of Germany used as input to the AMM is discussed in the HIMO study (Nuttall and Randolph 1976).* A description of the data-gathering procedures used to describe the E-FOSS study area are given in the E-FOSS study report (West, Krivitzky, and Randolph 1980). The HIMO and E-FOSS study areas cover part of the same area in the Federal Republic of Germany (Figure A1). The E-FOSS area made use of some additional data; therefore, it is normally used for areas where both data groups are available. The Schotten quad (L5520) is the area from which HIMO data were gathered; the Lauterbach quad is from the E-FOSS study area.

3. Procedures for describing study areas in the Dasht-E Arzhan quad in Iran and the Mafraq quad in Jordan were the same as those used in describing the E-FOSS study areas. These areas are shown in Figures 2 and 3 in the main text.

4. The terrain and road factors required for the AMC-74X and SWIMCRIT/WACROSS prediction models are given in Table A6.

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* References for this and subsequent appendices are located in the References section at the end of the main text.

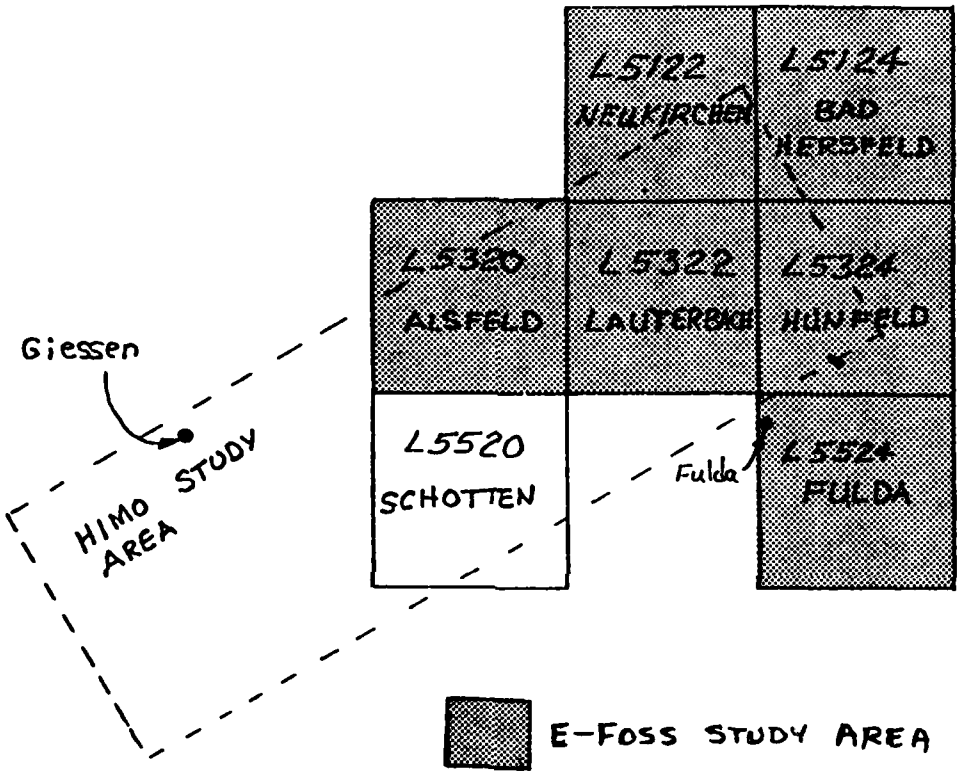


Figure A1. Location of terrain used for mobility study

Table A1

Vehicle Characteristics Used in the Army Mobility Model (AMM)

| NO. | IDENTIFICATION | DIMENSIONS | VEHICLE 1 | VEHICLE 2 | VEHICLE 3 |
|---|---|---|---|---|---|
| | | | 1 | 1 | 1 |
| 1 | VEHICLE TYPE (NVEH=0 FOR TRACKED AND 1 FOR WHEELED) | -- | | | |
| 2 | GROSS VEHICLE WEIGHT | LBS | 50,239. | 50,739. | 65,776. |
| 3 | TRACK TYPE (NFL=0 FOR FLEXIBLE AND 1 FOR GIRDERIZED) | NA | NA | NA | NA |
| 4 | GROUSER HEIGHT FOR TRACKS | IN. | NA | NA | NA |
| 5 | TIRE PLY RATING | -- | 14 | 12 | 28 |
| 6 | GROSS RATED HORSEPOWER | BHP | 250. | 249. | 399. |
| 7 | NUMBER OF TRACKS OR TIRES | -- | 10. | 10. | 8. |
| 8 | NUMBER OF AXLES | -- | 3 | 3 | 4 |
| 9 | VEHICLE WIDTH | IN. | 113.0 | 114.0 | 113.0 |
| 10 | VEHICLE LENGTH | IN. | 370.0 | 370.0 | 361.0 |
| 11 | TRACK WIDTH OR NOMINAL TIRE WIDTH | IN. | 11.5 | 14.5 | 16.5 |
| 12 | WHEEL RIM DIAMETER ON ROAD WHEEL RADIUS | IN. | 20.0 | 20.0 | 20.0 |
| 13 | RECOMMENDED TIRE PRESSURE (CROSS-COUNTRY) | PSI | 65 | 48 | 33 |
| 14 | AREA OF ONE-TRACK SHOE (TRACKED) OR NUMBER OF WHEELS (WHEELED) (DUALS AS ONE) | SQ IN. OR # | 6 | 6 | 8 |
| 15 | NUMBER OF BOGIES (TRACKED) OR CHAIN INDICATOR WHEELED (0=NO CHAINS; 1=CHAINS) | -- | 0 | 0 | 0 |
| 16 | VEHICLE GROUND CLEARANCE AT THE CENTER OF GREATEST WHEEL SPAN | IN. | 14.4 | 16.4 | 24.1 |
| 17 | MINIMUM VEHICLE GROUND CLEARANCE | IN. | 10.2 | 12.2 | 13.4 |
| 18 | REAR END CLEARANCE (VERTICAL CLEARANCE OF VEHICLE'S TRAILING EDGE) | IN. | 45.0 | 47.0 | 36.9 |
| 19 | VEHICLE DEPARTURE ANGLE | DEG | 29.0 | 31.0 | 45.0 |
| 20 | VEHICLE APPROACH ANGLE | DEG | 46.0 | 48.0 | 43.0 |
| 21 | LENGTH OF TRACK ON GROUND OR WHEEL DIAMETER | IN. | 42.0 | 48.7 | 52.9 |
| 22 | HEIGHT OF VEHICLE PUSHBAR, BUMPER, OR LEADING EDGE | IN. | 35.7 | 37.7 | 42.0 |
| 23 | DISTANCE BETWEEN FIRST AND LAST WHEEL CENTER LINES | IN. | 243.0 | 243.0 | 270.0 |
| 24 | HORIZONTAL DISTANCE FROM THE CENTER OF GRAVITY TO THE FRONT WHEEL CENTER LINES | IN. | 160.3 | 160.3 | 139.2 |
| 25 | VERTICAL DISTANCE FROM THE CENTER OF GRAVITY TO THE ROAD WHEEL CENTER LINES | IN. | 50.0 | 50.0 | 53.2 |
| 26 | MAXIMUM SPAN BETWEEN ADJACENT WHEEL CENTER LINES | IN. | 187.0 | 187.0 | 150.0 |
| 27 | VERTICAL DISTANCE FROM THE GROUND TO CENTER OF REAR WHEEL (IDLER OR SPROCKET FOR TRACKED VEHICLE) | IN. | 20.5 | 22.5 | 23.8 |
| 28 | TRACK THICKNESS PLUS THE RADIUS OF THE REAR IDLER OR SPROCKET | IN. | NA | NA | NA |
| 29 | ROAD WHEEL RADIUS PLUS TRACK THICKNESS | IN. | NA | NA | NA |
| 30 | LOADED ROLLING RADIUS OF TIRE (CROSS-COUNTRY TIRE PRESSURE) OR SPROCKET PITCH RADIUS | IN. | 20.5 | 22.5 | 23.8 |
| 31 | HEIGHT OF RIGID POINT USED TO DETERMINE APPROACH ANGLE | IN. | 35.7 | 37.7 | 42.0 |
| 32 | MAXIMUM BRAKING FORCE THE VEHICLE DEVELOPS | LBS | 40,191. | 40,591. | 52,621. |
| 33 | LOADED WHEEL DEFLECTION (AT SAND TIRE PRESSURE) | % | 25. | 25. | 25. |
| 34 | DISTANCE VEHICLE SPANS BEFORE SIGNIFICANT MOTION BEGINS | IN. | 21.0 | 24.4 | 60.0 |
| 35 | MAXIMUM FORCE THE PUSHBAR CAN WITHSTAND | KIPS | 50.2 | 50.7 | 65.8 |
| 36 | MAXIMUM AXLE LOAD/GROSS VEHICLE WEIGHT | -- | 50,239.000 | 50,739.000 | 65,776.000 |
| 37 | VEHICLE RATED HORSEPOWER PER TON | HP/TON | 10.0 | 9.8 | 12.2 |
| 38 | TRANSMISSION TYPE (0=AUTOMATIC, 1=MANUAL) | -- | 1. | 1. | 0. |
| 39 | FINAL DRIVE GEAR RATIO | -- | 6.44 | 6.44 | 5.45 |
| 40 | FINAL DRIVE GEAR EFFICIENCY | -- | 0.90 | 0.90 | 0.95 |
| 41 | NUMBER OF GEAR RATIOS | -- | 10. | 10. | 4. |
| 42 | TRANSMISSSION EFFICIENCY | -- | 0.90 | 0.90 | 0.95 |

(Continued)

Table A1 (Concluded)

| NO | IDENTIFICATION | DIMENSIONS | VEHICLE 4 | VEHICLE 5 | VEHICLE 6 |
|---|---|---|---|---|---|
| 1 | VEHICLE TYPE (NVEH=0 FOR TRACKED AND 1 FOR WHEELED) | -- | 1 | 0 | 1 |
| 2 | GROSS VEHICLE WEIGHT | LBS | 32,080. | 53,060. | 50,239. |
| 3 | TRACK TYPE (NFL=0 FOR FLEXIBLE AND 1 FOR GIRDERIZED) | NA | NA | 0 | NA |
| 4 | GROUSER HEIGHT FOR TRACKS | IN. | NA | 1 | NA |
| 5 | TIRE PLY RATING | -- | 12 | NA | 14 |
| 6 | GROSS RATED HORSEPOWER | BHP | 250. | 416. | 250. |
| 7 | NUMBER OF TRACKS OR TIRES | -- | 10. | 2. | 10. |
| 8 | NUMBER OF AXLES | -- | 3 | NA | 3 |
| 9 | VEHICLE WIDTH | IN. | 96.0 | 124.0 | 113.0 |
| 10 | VEHICLE LENGTH | IN. | 300.0 | 240.5 | 370.0 |
| 11 | TRACK WIDTH OR NOMINAL TIRE WIDTH | IN. | 11.5 | 15.0 | 11.5 |
| 12 | WHEEL RIM DIAMETER ON ROAD WHEEL RADIUS | IN. | 20.0 | NA | 20.0 |
| 13 | RECOMMENDED TIRE PRESSURE (CROSS-COUNTRY) | PSI | 45 | NA | 65 |
| 14 | AREA OF ONE-TRACK SHOE (TRACKED) OR NUMBER OF WHEELS (WHEELED) (DUALS AS ONE) | SQ IN. OR # | 6 | 90.0 | 6 |
| 15 | NUMBER OF BOGIES (TRACKED) OR CHAIN INDICATOR WHEELED (0=NO CHAINS; 1=CHAINS) | -- | 0 | 14 | 0 |
| 16 | VEHICLE GROUND CLEARANCE AT THE CENTER OF GREATEST WHEEL SPAN | IN. | 20.0 | NA | 14.4 |
| 17 | MINIMUM VEHICLE GROUND CLEARANCE | IN. | 11.5 | 17.7 | 10.2 |
| 18 | REAR END CLEARANCE (VERTICAL CLEARANCE OF VEHICLE'S TRAILING EDGE) | IN. | 34.5 | 31.0 | 45.0 |
| 19 | VEHICLE DEPARTURE ANGLE | DEG | 32.5 | 80.5 | 29.0 |
| 20 | VEHICLE APPROACH ANGLE | DEG | 46.0 | 75.0 | 46.0 |
| 21 | LENGTH OF TRACK ON GROUND OR WHEEL DIAMETER | IN. | 42.0 | 159.0 | 42.0 |
| 22 | HEIGHT OF VEHICLE PUSHBAR, BUMPER, OR LEADING EDGE | IN. | 34.5 | 45.0 | 35.7 |
| 23 | DISTANCE BETWEEN FIRST AND LAST WHEEL CENTER LINES | IN. | 206.0 | 156.0 | 243.0 |
| 24 | HORIZONTAL DISTANCE FROM THE CENTER OF GRAVITY TO THE FRONT WHEEL CENTER LINES | IN. | 126.2 | 94.0 | 160.3 |
| 25 | VERTICAL DISTANCE FROM THE CENTER OF GRAVITY TO THE ROAD WHEEL CENTER LINES | IN. | 30.6 | 31.9 | 50.0 |
| 26 | MAXIMUM SPAN BETWEEN ADJACENT WHEEL CENTER LINES | IN. | 154.0 | NA | 187.0 |
| 27 | VERTICAL DISTANCE FROM THE GROUND TO CENTER OF REAR WHEEL (IDLER OR SPROCKET FOR TRACKED VEHICLE) | IN. | 20.5 | 21.5 | 20.5 |
| 28 | TRACK THICKNESS PLUS THE RADIUS OF THE REAR IDLER OR SPROCKET | IN. | NA | 9.8 | NA |
| 29 | ROAD WHEEL RADIUS PLUS TRACK THICKNESS | IN. | NA | 13.0 | NA |
| 30 | LOADED ROLLING RADIUS OF TIRE (CROSS-COUNTRY TIRE PRESSURE) OR SPROCKET PITCH RADIUS | IN. | 20.5 | 9.8 | 20.5 |
| 31 | HEIGHT OF RIGID POINT USED TO DETERMINE APPROACH ANGLE | IN. | 34.5 | 45.0 | 35.7 |
| 32 | MAXIMUM BRAKING FORCE THE VEHICLE DEVELOPS | LBS | 25,664. | 31,836. | 40,191. |
| 33 | LOADED WHEEL DEFLECTION (AT SAND TIRE PRESSURE) | % | 25. | NA | 25. |
| 34 | DISTANCE VEHICLE SPANS BEFORE SIGNIFICANT MOTION BEGINS | IN. | 20.5 | 78.0 | 21.0 |
| 35 | MAXIMUM FORCE THE PUSHBAR CAN WITHSTAND | KIPS | 32.1 | 106.1 | 50.2 |
| 36 | MAXIMUM AXLE LOAD/GROSS VEHICLE WEIGHT | -- | 0.350 | NA | 50,239.000 |
| 37 | VEHICLE RATED HORSEPOWER PER TON | HP/TON | 15.6 | 15.7 | 10.0 |
| 38 | TRANSMISSION TYPE (0=AUTOMATIC, 1=MANUAL) | -- | 1. | 0. | 1. |
| 39 | FINAL DRIVE GEAR RATIO | -- | 6.44 | 4.36 | 6.44 |
| 40 | FINAL DRIVE GEAR EFFICIENCY | -- | 0.90 | 0.90 | 0.90 |
| 41 | NUMBER OF GEAR RATIOS | -- | 10. | 4. | 10. |
| 42 | TRANSMISSSION EFFICIENCY | -- | 0.90 | 0.95 | 0.90 |

Table A2

Gear Ratios (G1-G10) for Study Vehicles

| VEHICLES | G1 | G2 | G3 | G4 | G5 | G6 | G7 | G8 | G9 | G10 |
|---|---|---|---|---|---|---|---|---|---|---|
| VEHICLE 1 | 12.29 | 6.88 | 6.07 | 3.62 | 3.40 | 2.02 | 1.79 | 1.58 | 1.00 | 0.78 |
| VEHICLE 2 | 12.29 | 6.88 | 6.07 | 3.62 | 3.40 | 2.02 | 1.79 | 1.58 | 1.00 | 0.78 |
| VEHICLE 3 | 3.69 | 2.02 | 1.38 | 1.00 | | | | | | |
| VEHICLE 4 | 12.29 | 6.88 | 6.07 | 3.62 | 3.40 | 2.02 | 1.79 | 1.58 | 1.00 | 0.78 |
| VEHICLE 5 | 4.69 | 3.18 | 1.58 | 0.79 | | | | | | |
| VEHICLE 6 | 12.29 | 6.88 | 6.07 | 3.62 | 3.40 | 2.02 | 1.79 | 1.58 | 1.00 | 0.78 |

Table A3

Tractive Force versus Vehicle Speed

| VEHICLE 1 | | VEHICLE 2 | | VEHICLE 3 | | VEHICLE 4 | | VEHICLE 5 | | VEHICLE 6 | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| EHICLE SPEED MPH | TRACTIVE FORCE LB | VEHICLE SPEED MPH | TRACTIVE FORCE LB | VEHICLE SPEED MPH | TRACTIVE FORCE LB | VEHICLE SPEED MPH | TRACTIVE FORCE LB | VEHICLE SPEED MPH | TRACTIVE FORCE LB | VEHICLE SPEED MPH | TRACTIVE FORCE LB |
| 0. | 25,540 | 0. | 23,241 | 0. | 55,029 | 0. | 25,540 | 0. | 41,104 | 0. | 25,540 |
| 2.0 | 25,440 | 2.2 | 23,241 | 1.0 | 49,401 | 2.0 | 25,440 | 0.8 | 41,015 | 2.0 | 25,440 |
| 2.4 | 25,190 | 2.6 | 22,922 | 1.7 | 42,769 | 2.4 | 25,190 | 1.3 | 37,033 | 2.4 | 25,190 |
| 2.6 | 24,440 | 2.9 | 22,240 | 2.0 | 39,918 | 2.6 | 24,440 | 2.2 | 28,182 | 2.6 | 24,440 |
| 3.1 | 21,440 | 3.4 | 19,510 | 3.0 | 31,649 | 3.1 | 21,440 | 3.2 | 20,782 | 3.1 | 21,440 |
| 3.2 | 14,590 | 3.5 | 13,277 | 4.1 | 24,969 | 3.2 | 14,590 | 3.7 | 20,711 | 3.2 | 14,590 |
| 4.0 | 14,540 | 4.4 | 13,231 | 5.1 | 22,023 | 4.0 | 14,540 | 4.3 | 19,932 | 4.0 | 14,540 |
| 4.9 | 13,540 | 5.4 | 12,321 | 5.8 | 19,450 | 4.9 | 13,540 | 5.5 | 15,015 | 4.9 | 13,540 |
| 5.5 | 12,750 | 6.0 | 11,602 | 6.1 | 16,272 | 5.5 | 12,750 | 5.6 | 14,312 | 5.5 | 12,750 |
| 5.6 | 11,750 | 6.2 | 10,692 | 7.1 | 14,341 | 5.6 | 11,750 | 6.4 | 13,356 | 5.6 | 11,750 |
| 6.3 | 10,860 | 6.9 | 9,883 | 8.1 | 12,485 | 6.3 | 10,860 | 7.4 | 11,532 | 6.3 | 10,860 |
| 6.4 | 7,860 | 7.0 | 7,153 | 9.2 | 12,272 | 6.4 | 7,860 | 8.2 | 10,312 | 6.4 | 7,860 |
| 7.6 | 7,830 | 8.4 | 7,125 | 10.2 | 11,352 | 7.6 | 7,830 | 8.3 | 8,634 | 7.6 | 7,830 |
| 9.0 | 7,500 | 9.9 | 6,825 | 11.2 | 9,237 | 9.0 | 7,500 | 10.3 | 6,780 | 9.0 | 7,500 |
| 11.0 | 6,730 | 12.1 | 6,124 | 12.2 | 8,843 | 11.0 | 6,730 | 12.0 | 6,718 | 11.0 | 6,730 |
| 11.1 | 6,630 | 12.2 | 6,033 | 13.2 | 8,556 | 11.1 | 6,630 | 14.1 | 6,293 | 11.1 | 6,630 |
| 11.6 | 6,340 | 12.8 | 5,770 | 14.2 | 7,954 | 11.6 | 6,340 | 16.0 | 5,155 | 11.6 | 6,340 |
| 11.7 | 4,690 | 12.9 | 4,268 | 18.3 | 6,167 | 11.7 | 4,690 | 16.1 | 4,452 | 11.7 | 4,690 |
| 13.7 | 4,670 | 15.1 | 4,250 | 20.3 | 5,723 | 13.7 | 4,670 | 20.2 | 3,363 | 13.7 | 4,670 |
| 16.0 | 4,560 | 17.6 | 4,150 | 22.4 | 4,529 | 16.0 | 4,560 | 24.0 | 3,355 | 16.0 | 4,560 |
| 19.7 | 4,060 | 21.7 | 3,695 | 26.4 | 4,340 | 19.7 | 4,060 | 28.2 | 3,142 | 19.7 | 4,060 |
| 19.8 | 3,960 | 21.8 | 3,604 | 30.5 | 3,386 | 19.8 | 3,960 | 32.0 | 2,576 | 19.8 | 3,960 |
| 22.5 | 3,600 | 24.8 | 3,276 | 36.6 | 3,115 | 22.5 | 3,600 | 32.0 | 0 | 22.5 | 3,600 |
| 22.6 | 3,500 | 24.9 | 3,185 | 40.7 | 2,873 | 22.6 | 3,500 | | | 22.6 | 3,500 |
| 25.4 | 3,220 | 27.9 | 2,930 | 44.8 | 2,301 | 25.4 | 3,220 | | | 25.4 | 3,220 |
| 25.5 | 2,420 | 28.0 | 2,202 | 48.8 | 2,295 | 25.5 | 2,420 | | | 25.5 | 2,420 |
| 28.6 | 2,410 | 31.5 | 2,193 | 50.8 | 2,241 | 28.6 | 2,410 | | | 28.6 | 2,410 |
| 35.4 | 2,210 | 38.9 | 2,011 | 57.0 | 2,043 | 35.4 | 2,210 | | | 35.4 | 2,210 |
| 40.3 | 2,010 | 44.3 | 1,829 | 61.0 | 1,385 | 40.3 | 2,010 | | | 40.3 | 2,010 |
| 40.4 | 1,860 | 44.4 | 1,693 | 62.4 | 1,034 | 40.4 | 1,860 | | | 40.4 | 1,860 |
| 45.4 | 1,730 | 49.9 | 1,574 | 62.4 | 0 | 45.4 | 1,730 | | | 45.4 | 1,730 |
| 50.0 | 1,610 | 55.0 | 1,465 | | | 50.0 | 1,610 | | | 50.0 | 1,610 |
| 50.0 | 0 | 55.0 | 0 | | | 50.0 | 0 | | | 50.0 | 0 |

Table A4

Vehicle Speed versus Surface Roughness

| VEHICLE 1 | | VEHICLE 2 | | VEHICLE 3 | | VEHICLE 4 | | VEHICLE 5 | | VEHICLE 6 | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ELEVATION RMS IN. | SPEED MPH | ELEVATION RMS IN. | SPEED MPH | ELEVATION RMS IN. | SPEED MPH | ELEVATION RMS IN. | SPEED MPH | ELEVATION RMS IN. | SPEED MPH | ELEVATION RMS IN. | SPEED MPH |
| 0. | 100.00 | 0. | 100.00 | 0. | 55.00 | 0. | 100.00 | 0. | 80.00 | 0. | 100.00 |
| 0.40 | 100.00 | 0.40 | 100.00 | 0.22 | 55.00 | 0.10 | 100.00 | 0.33 | 60.00 | 0.30 | 100.00 |
| 0.50 | 19.80 | 0.50 | 19.80 | 0.40 | 30.10 | 0.20 | 100.00 | 0.50 | 51.00 | 0.34 | 30.00 |
| 0.60 | 14.10 | 0.60 | 14.10 | 0.68 | 22.70 | 0.30 | 100.00 | 0.72 | 40.00 | 0.40 | 20.00 |
| 0.80 | 10.60 | 0.80 | 10.60 | 1.04 | 16.00 | 0.40 | 100.00 | 0.90 | 33.00 | 0.50 | 13.00 |
| 1.00 | 9.10 | 1.00 | 9.10 | 1.32 | 12.90 | 0.50 | 14.80 | 1.00 | 30.00 | 0.63 | 10.00 |
| 1.20 | 8.40 | 1.20 | 8.40 | 1.60 | 10.00 | 0.60 | 14.10 | 1.15 | 26.00 | 0.70 | 9.00 |
| 1.40 | 8.00 | 1.40 | 8.00 | 2.00 | 7.50 | 0.80 | 10.60 | 1.30 | 21.00 | 1.00 | 8.20 |
| 1.60 | 8.00 | 1.60 | 8.00 | 3.00 | 6.00 | 1.00 | 9.10 | 1.41 | 20.00 | 1.50 | 7.60 |
| 1.80 | 8.00 | 1.80 | 8.00 | 5.00 | 5.90 | 1.20 | 8.40 | 1.50 | 19.00 | 2.00 | 7.20 |
| 2.00 | 8.00 | 2.00 | 8.00 | | | 1.40 | 8.00 | 1.60 | 18.00 | 3.00 | 7.10 |
| 2.20 | 7.90 | 2.20 | 7.90 | | | 1.60 | 8.00 | 1.75 | 17.00 | 5.00 | 7.00 |
| 2.40 | 7.90 | 2.40 | 7.90 | | | 1.80 | 8.00 | 1.80 | 16.50 | | |
| 2.60 | 7.80 | 2.60 | 7.80 | | | 2.00 | 8.00 | 2.00 | 16.00 | | |
| 2.80 | 7.80 | 2.80 | 7.80 | | | 2.20 | 7.90 | 2.25 | 15.00 | | |
| 3.00 | 7.70 | 3.00 | 7.70 | | | 2.40 | 7.90 | 2.50 | 14.80 | | |
| 3.50 | 7.60 | 3.50 | 7.60 | | | 2.60 | 7.80 | 2.75 | 14.00 | | |
| 4.00 | 7.50 | 4.00 | 7.50 | | | 2.80 | 7.80 | 3.00 | 13.80 | | |
| 4.50 | 7.30 | 4.50 | 7.33 | | | 3.00 | 7.70 | 8.00 | 13.50 | | |
| 5.00 | 7.20 | 5.00 | 7.20 | | | 3.50 | 7.60 | | | | |
| | | | | | | 4.00 | 7.50 | | | | |
| | | | | | | 4.50 | 7.30 | | | | |
| | | | | | | 5.00 | 7.20 | | | | |

Table A5

Vehicle Speed at 2.5-g Acceleration versus Obstacle Height

| VEHICLE 1 | | VEHICLE 2 | | VEHICLE 3 | | VEHICLE 4 | | VEHICLE 5 | | VEHICLE 6 | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| OBSTACLE HEIGHT IN. | VEHICLE SPEED MPH | OBSTACLE HEIGHT IN. | VEHICLE SPEED MPH | OBSTACLE HEIGHT IN. | VEHICLE SPEED MPH | OBSTACLE HEIGHT IN. | VEHICLE SPEED MPH | OBSTACLE HEIGHT IN. | VEHICLE SPEED MPH | OBSTACLE HEIGHT IN. | VEHICLE SPEED MPH |
| 0. | 100.00 | 0. | 100.00 | 0. | 55.00 | 0. | 100.00 | 0. | 100.00 | 0. | 100.00 |
| 5.00 | 100.00 | 5.00 | 100.00 | 7.00 | 55.00 | 1.00 | 100.00 | 8.00 | 100.00 | 6.00 | 100.00 |
| 6.00 | 30.20 | 6.00 | 30.20 | 8.00 | 18.30 | 2.00 | 100.00 | 9.00 | 26.00 | 6.40 | 40.00 |
| 7.00 | 14.00 | 7.00 | 14.00 | 9.00 | 3.90 | 3.00 | 100.00 | 10.00 | 13.00 | 6.60 | 30.00 |
| 8.00 | 8.40 | 8.00 | 8.40 | 10.00 | 3.50 | 4.00 | 100.00 | 11.00 | 8.00 | 7.00 | 20.00 |
| 9.00 | 7.00 | 9.00 | 7.00 | 12.00 | 3.50 | 5.00 | 100.00 | 12.00 | 5.80 | 8.30 | 10.00 |
| 10.00 | 6.00 | 10.00 | 6.00 | 60.00 | 2.00 | 6.00 | 30.20 | 13.00 | 4.50 | 10.00 | 6.00 |
| 11.00 | 5.50 | 11.00 | 5.50 | | | 7.00 | 14.00 | 14.00 | 3.70 | 11.00 | 5.50 |
| 12.00 | 5.00 | 12.00 | 5.00 | | | 8.00 | 5.00 | 15.00 | 3.00 | 12.00 | 5.00 |
| 13.00 | 4.80 | 13.00 | 4.80 | | | 9.00 | 4.80 | 16.00 | 2.40 | 13.00 | 4.80 |
| 14.00 | 4.50 | 14.00 | 4.50 | | | 10.00 | 4.40 | 60.00 | 2.00 | 14.00 | 4.50 |
| 15.00 | 4.00 | 15.00 | 4.00 | | | 11.00 | 4.30 | | | 15.00 | 4.00 |
| 16.00 | 3.80 | 16.00 | 3.80 | | | 12.00 | 4.20 | | | 16.00 | 3.80 |
| 60.00 | 2.00 | 60.00 | 2.00 | | | 13.00 | 4.10 | | | 60.00 | 2.00 |
| | | | | | | 14.00 | 4.00 | | | | |
| | | | | | | 15.00 | 3.90 | | | | |
| | | | | | | 16.00 | 3.80 | | | | |
| | | | | | | 60.00 | 2.00 | | | | |

Table A6

Terrain Data Required for AMC-74X and SWIMCRIT Water-Crossing Prediction Models

| Terrain or Road Factor | Range |
|---|---|
| **Off-Road** | |
| Surface material | |
| Type, USCS or other | NA* |
| Mass strength, CI or RCI | 0 - >280 |
| Slope, percent | 0 - >70 |
| Obstacle | |
| Approach angle, deg | 90 - 270 |
| Vertical magnitude, cm | 0 - >85 |
| Length, m | 0 - >150 |
| Width, cm | 0 - >1200 |
| Spacing, m | 0 - >60 |
| Spacing, type | NA* |
| Surface roughness, rms elevation | 0 - 10 |
| Stem diameter, cm (8 pairs) | 0 - >25 |
| Stem spacing, m (8 pairs) | 0 - >100 |
| Visibility distance, m | 0 - >50 |
| Water depth, m | 0 - >5 |
| Water velocity, mps | 0 - >3.5 |
| Water width, m | 0 - >70 |
| Linear feature top width, m | 0 - >70 |
| Left approach angle, deg | 90 - 270 |
| Right approach angle, deg | 90 - 270 |
| Differential bank height or differential vertical magnitude, m | 0 - >4 |
| Low bank height or least vertical magnitude, m | 0 - >6 |
| **On-Road** | |
| Road type | NA* |
| Surface material | |
| Type, USCS or other | NA* |
| Surface strength | |
| Trails, CI or RCI | 0 - >280 |
| Other, traction coefficients | 0.01 - >0.80 |
| Slope, percent | 0 - >70 |
| Surface roughness, rms elevation | 0 - >7.6 |
| Curvature, deg | 0 - 90 |
| Roadside visibility distance (trails only), m | 0 - >50 |

* NA = Not applicable.

# APPENDIX B: DETAILED MOBILITY PERFORMANCE DATA

1. This appendix contains the speed profiles, the percent NOGO, and the reason for NOGO on roads and off-road terrain, the performance data for the study vehicles crossing linear features (water crossings), and mobility rating speeds at the tactical mobility levels and MICOM mobility level.

2. The speed profile data for the study vehicles over primary roads, secondary roads, trails, and off-road terrain for the dry, wet normal, wet-wet slippery, and snow surface conditions in the Lauterbach and Schotten quads in the Federal Republic of Germany are given in Tables B1-B6. The speed profile data for the Mafraq quad in Jordan are given in Tables B7-B12 and for the Dasht-E Arzhan quad in Iran are given in Tables B13-B18.

3. The percent NOGO on trails and off-road terrain for the dry, wet normal, wet-wet slippery, and snow conditions in the Lauterbach and Schotten quads are given in Table B19. The percent NOGO on trails and off-road terrain for the dry, wet-wet slippery, and sand conditions in the Mafraq quad are given in Table B20, while the percent NOGO for the Dasht-E Arzhan quad are given in Table B21.

4. The performance data for the study vehicles crossing linear features (water crossings) for the study areas in the Lauterbach and Mafraq quads are given in Table B22. Water-crossing data were not available for the Dasht-E Arzhan quad but were assumed to be the same as for the Mafraq quad.

5. The mobility rating speed data for the study vehicles at the tactical mobility levels and the MICOM mobility level are given for the Lauterbach and Schotten quads in the Federal Republic of Germany (Table B23), the Mafraq quad in Jordan (Table B24), and the Dasht-E Arzhan quad in Iran (Table B25).

Table B1

Speed Profiles (mph) for Vehicle 1 in Schotten Quad (L5520) for Roads and Lauterbach Quad (L5322) for Off-Roads in the Federal Republic of Germany

## Dry Condition

### Primary Roads

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 50.0 | 50.0 | 50.0 | 50.0 | 50.0 |
| 1X | 50.0 | 50.0 | 50.0 | 50.0 | 50.0 |
| 2X | 50.0 | 50.0 | 50.0 | 50.0 | 50.0 |
| 3X | 50.0 | 50.0 | 50.0 | 50.0 | 50.0 |
| 4X | 49.9 | 49.5 | 49.0 | 48.4 | 47.8 |
| 5X | 47.3 | 46.8 | 46.2 | 45.6 | 44.9 |
| 6X | 44.3 | 43.7 | 43.2 | 42.7 | 42.3 |
| 7X | 41.8 | 41.4 | 40.9 | 40.3 | 39.6 |
| 8X | 38.8 | 37.9 | 37.1 | 36.2 | 35.1 |
| 9X | 34.1 | 33.2 | 32.4 | 31.5 | 30.3 |
| 10X | 29.1 | | | | |

### Secondary Roads

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 50.0 | 49.3 | 48.6 | 48.4 | 48.3 |
| 1X | 47.7 | 46.5 | 45.0 | 44.0 | 43.0 |
| 2X | 41.7 | 40.2 | 38.0 | 36.4 | 35.1 |
| 3X | 34.0 | 33.1 | 32.2 | 31.2 | 30.2 |
| 4X | 29.0 | 27.8 | 26.8 | 25.9 | 25.1 |
| 5X | 24.4 | 23.7 | 23.1 | 22.6 | 22.2 |
| 6X | 21.8 | 21.4 | 21.0 | 20.7 | 20.4 |
| 7X | 20.2 | 19.9 | 19.7 | 19.5 | 19.3 |
| 8X | 19.1 | 18.9 | 18.7 | 18.5 | 18.4 |
| 9X | 18.2 | 18.0 | 17.8 | 17.5 | 17.2 |
| 10X | 16.9 | | | | |

### Trails

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 10.6 | 10.6 | 10.6 | 10.6 | 10.6 |
| 1X | 10.4 | 10.2 | 10.0 | 9.9 | 9.8 |
| 2X | 9.7 | 9.6 | 9.6 | 9.6 | 9.5 |
| 3X | 9.4 | 9.3 | 9.2 | 9.1 | 9.1 |
| 4X | 9.0 | 8.9 | 8.9 | 8.8 | 8.8 |
| 5X | 8.8 | 8.7 | 8.7 | 8.7 | 8.7 |
| 6X | 8.6 | 8.6 | 8.6 | 8.6 | 8.6 |
| 7X | 8.5 | 8.5 | 8.5 | 8.5 | 8.5 |
| 8X | 8.4 | 8.4 | 8.4 | 8.4 | 8.4 |
| 9X | 8.4 | 8.3 | 8.3 | 8.2 | 8.1 |
| 10X | 8.0 | | | | |

### Off-Road

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 46.0 | 32.3 | 27.8 | 25.1 | 23.2 |
| 1X | 21.4 | 20.1 | 19.0 | 18.0 | 17.3 |
| 2X | 16.6 | 16.1 | 15.7 | 15.2 | 14.7 |
| 3X | 14.3 | 14.0 | 13.6 | 13.2 | 12.9 |
| 4X | 12.6 | 12.3 | 12.1 | 11.8 | 11.6 |
| 5X | 11.4 | 11.2 | 11.0 | 10.8 | 10.6 |
| 6X | 10.5 | 10.3 | 10.1 | 9.9 | 9.8 |
| 7X | 9.6 | 9.4 | 9.2 | 9.0 | 8.8 |
| 8X | 8.6 | 8.4 | 8.1 | 3.9 | 2.1 |
| 9X | 1.5 | 1.1 | 0.9 | 0.8 | 0.7 |
| 10X | 0.6 | | | | |

## Wet Normal Condition

### Primary Roads

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 50.0 | 50.0 | 50.0 | 50.0 | 50.0 |
| 1X | 50.0 | 50.0 | 50.0 | 50.0 | 50.0 |
| 2X | 50.0 | 50.0 | 50.0 | 50.0 | 50.0 |
| 3X | 50.0 | 50.0 | 50.0 | 50.0 | 50.0 |
| 4X | 49.9 | 49.5 | 49.0 | 48.4 | 47.8 |
| 5X | 47.3 | 46.8 | 46.2 | 45.6 | 44.9 |
| 6X | 44.3 | 43.7 | 43.2 | 42.7 | 42.3 |
| 7X | 41.8 | 41.4 | 40.9 | 40.3 | 39.6 |
| 8X | 38.8 | 37.9 | 37.1 | 36.2 | 35.1 |
| 9X | 34.1 | 33.2 | 32.4 | 31.5 | 30.3 |
| 10X | 29.1 | | | | |

### Secondary Roads

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 50.0 | 49.3 | 48.6 | 48.4 | 48.3 |
| 1X | 47.7 | 46.5 | 45.0 | 44.0 | 43.0 |
| 2X | 41.7 | 40.2 | 38.0 | 36.4 | 35.1 |
| 3X | 34.0 | 33.1 | 32.2 | 31.2 | 30.2 |
| 4X | 29.0 | 27.8 | 26.8 | 25.9 | 25.1 |
| 5X | 24.4 | 23.7 | 23.1 | 22.6 | 22.2 |
| 6X | 21.8 | 21.4 | 21.0 | 20.7 | 20.4 |
| 7X | 20.2 | 19.9 | 19.7 | 19.5 | 19.3 |
| 8X | 19.1 | 18.9 | 18.7 | 18.5 | 18.4 |
| 9X | 18.2 | 18.0 | 17.8 | 17.5 | 17.2 |
| 10X | 16.9 | | | | |

### Trails

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 10.6 | 10.6 | 10.6 | 10.5 | 10.3 |
| 1X | 10.0 | 9.8 | 9.7 | 9.6 | 9.6 |
| 2X | 9.5 | 9.4 | 9.3 | 9.2 | 9.1 |
| 3X | 9.0 | 8.9 | 8.9 | 8.8 | 8.8 |
| 4X | 8.7 | 8.7 | 8.6 | 8.6 | 8.6 |
| 5X | 8.6 | 8.5 | 8.5 | 8.5 | 8.5 |
| 6X | 8.4 | 8.4 | 8.4 | 8.4 | 8.4 |
| 7X | 8.3 | 8.3 | 8.3 | 8.3 | 8.3 |
| 8X | 8.2 | 8.2 | 8.2 | 8.2 | 8.1 |
| 9X | 8.1 | 8.1 | 8.0 | 7.9 | 7.8 |
| 10X | 5.6 | | | | |

### Off-Road

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 28.5 | 18.7 | 16.5 | 14.9 | 13.8 |
| 1X | 12.8 | 12.0 | 11.3 | 10.7 | 10.2 |
| 2X | 9.7 | 9.2 | 8.8 | 8.3 | 7.8 |
| 3X | 6.8 | 1.9 | 0.9 | 0.6 | 0.5 |
| 4X | 0.4 | 0.4 | 0.3 | 0.3 | 0.3 |
| 5X | 0.3 | 0.2 | 0.2 | 0.2 | 0.2 |
| 6X | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 |
| 7X | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 |
| 8X | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 |
| 9X | 0.2 | 0.1 | 0.1 | 0.1 | 0.1 |
| 10X | 0.1 | | | | |

## Wet-Wet Slippery Condition

### Primary Roads

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 50.0 | 50.0 | 50.0 | 50.0 | 50.0 |
| 1X | 50.0 | 50.0 | 50.0 | 50.0 | 50.0 |
| 2X | 50.0 | 50.0 | 50.0 | 50.0 | 50.0 |
| 3X | 50.0 | 50.0 | 50.0 | 50.0 | 50.0 |
| 4X | 49.9 | 49.5 | 48.9 | 48.2 | 47.7 |
| 5X | 47.2 | 46.5 | 45.9 | 45.2 | 44.5 |
| 6X | 43.9 | 43.4 | 42.9 | 42.4 | 42.0 |
| 7X | 41.6 | 41.0 | 40.4 | 39.7 | 38.8 |
| 8X | 37.9 | 37.1 | 36.3 | 35.2 | 34.2 |
| 9X | 33.3 | 32.4 | 31.6 | 30.7 | 29.5 |
| 10X | 28.2 | | | | |

### Secondary Roads

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 50.0 | 49.3 | 48.6 | 48.4 | 48.3 |
| 1X | 47.6 | 46.3 | 44.9 | 43.8 | 42.9 |
| 2X | 41.5 | 39.7 | 37.6 | 36.0 | 34.8 |
| 3X | 33.7 | 32.8 | 31.8 | 30.8 | 29.7 |
| 4X | 28.4 | 27.3 | 26.3 | 25.5 | 24.7 |
| 5X | 24.0 | 23.4 | 22.8 | 22.3 | 21.9 |
| 6X | 21.5 | 21.1 | 20.8 | 20.5 | 20.3 |
| 7X | 20.0 | 19.8 | 19.6 | 19.4 | 19.2 |
| 8X | 19.0 | 18.8 | 18.6 | 18.4 | 18.2 |
| 9X | 18.1 | 17.9 | 17.6 | 17.4 | 17.1 |
| 10X | 16.7 | | | | |

### Trails

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 10.6 | 10.6 | 10.6 | 10.3 | 10.0 |
| 1X | 9.8 | 9.7 | 9.5 | 9.4 | 9.2 |
| 2X | 9.1 | 9.0 | 8.9 | 8.9 | 8.8 |
| 3X | 8.7 | 8.7 | 8.6 | 8.6 | 8.6 |
| 4X | 8.5 | 8.5 | 8.5 | 8.5 | 8.4 |
| 5X | 8.4 | 8.4 | 8.4 | 8.3 | 8.3 |
| 6X | 8.3 | 8.3 | 8.3 | 8.2 | 8.2 |
| 7X | 8.2 | 8.2 | 8.2 | 8.1 | 8.1 |
| 8X | 8.1 | 8.1 | 8.0 | 8.0 | 8.0 |
| 9X | 8.0 | 7.9 | 7.9 | 7.7 | 7.6 |
| 10X | 3.5 | | | | |

### Off-Road

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 26.4 | 15.5 | 13.7 | 12.6 | 11.7 |
| 1X | 10.9 | 10.3 | 9.8 | 9.2 | 8.7 |
| 2X | 8.3 | 7.8 | 7.3 | 2.6 | 0.9 |
| 3X | 0.6 | 0.5 | 0.4 | 0.3 | 0.3 |
| 4X | 0.3 | 0.2 | 0.2 | 0.2 | 0.2 |
| 5X | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 |
| 6X | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 |
| 7X | 0.2 | 0.2 | 0.2 | 0.1 | 0.1 |
| 8X | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| 9X | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| 10X | 0.1 | | | | |

## Snow Condition

### Primary Roads

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 40.5 | 40.5 | 40.5 | 40.5 | 40.5 |
| 1X | 40.5 | 40.5 | 40.5 | 40.5 | 40.5 |
| 2X | 40.5 | 40.5 | 40.5 | 40.5 | 40.5 |
| 3X | 40.5 | 40.5 | 40.5 | 40.5 | 40.5 |
| 4X | 40.3 | 40.0 | 39.7 | 39.3 | 39.0 |
| 5X | 38.7 | 38.2 | 37.7 | 37.2 | 36.8 |
| 6X | 36.4 | 36.0 | 35.7 | 35.4 | 35.0 |
| 7X | 34.6 | 34.0 | 33.3 | 32.7 | 32.1 |
| 8X | 31.5 | 30.7 | 30.0 | 29.3 | 28.7 |
| 9X | 28.1 | 27.5 | 26.7 | 25.9 | 24.8 |
| 10X | 23.4 | | | | |

### Secondary Roads

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 37.1 | 37.1 | 37.1 | 37.1 | 37.1 |
| 1X | 37.0 | 36.4 | 35.7 | 35.2 | 34.6 |
| 2X | 33.8 | 32.2 | 30.9 | 29.8 | 29.0 |
| 3X | 28.2 | 27.6 | 26.9 | 25.9 | 25.0 |
| 4X | 24.2 | 23.5 | 22.9 | 22.3 | 21.8 |
| 5X | 21.3 | 20.9 | 20.5 | 20.2 | 19.9 |
| 6X | 19.6 | 19.4 | 19.2 | 19.0 | 18.8 |
| 7X | 18.6 | 18.4 | 18.2 | 18.1 | 17.9 |
| 8X | 17.7 | 17.6 | 17.4 | 17.3 | 17.1 |
| 9X | 16.9 | 16.7 | 16.5 | 16.2 | 15.8 |
| 10X | 15.4 | | | | |

### Trails

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 6.4 | 6.4 | 6.2 | 6.2 | 6.2 |
| 1X | 6.1 | 6.1 | 6.1 | 6.1 | 6.1 |
| 2X | 6.1 | 6.1 | 6.0 | 6.0 | 6.0 |
| 3X | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 |
| 4X | 6.0 | 6.0 | 5.9 | 5.9 | 5.9 |
| 5X | 5.9 | 5.9 | 5.9 | 5.9 | 5.9 |
| 6X | 5.9 | 5.9 | 5.9 | 5.9 | 5.9 |
| 7X | 5.9 | 5.9 | 5.9 | 5.8 | 5.8 |
| 8X | 5.8 | 5.8 | 5.8 | 5.8 | 5.7 |
| 9X | 5.7 | 5.6 | 5.6 | 5.5 | 5.4 |
| 10X | 5.1 | | | | |

### Off-Road

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 6.3 | 6.2 | 6.1 | 6.1 | 6.0 |
| 1X | 6.0 | 6.0 | 5.9 | 5.9 | 5.9 |
| 2X | 5.8 | 5.8 | 5.8 | 5.8 | 5.7 |
| 3X | 5.7 | 5.7 | 5.7 | 5.7 | 5.6 |
| 4X | 5.6 | 5.5 | 5.5 | 5.5 | 5.4 |
| 5X | 5.4 | 5.3 | 5.3 | 5.2 | 5.2 |
| 6X | 5.1 | 5.0 | 5.0 | 4.9 | 4.8 |
| 7X | 4.6 | 4.4 | 2.9 | 1.7 | 1.2 |
| 8X | 0.9 | 0.8 | 0.7 | 0.6 | 0.5 |
| 9X | 0.5 | 0.4 | 0.4 | 0.4 | 0.4 |
| 10X | 0.4 | | | | |

Table B2

Speed Profiles (mph) for Vehicle 2 in Schotten Quad (L5520) for Roads and Lauterbach Quad (L5322) for Off-Roads in the Federal Republic of Germany

## Dry Condition

| Primary Roads | | | | | | Secondary Roads | | | | | | Trails | | | | | | Off-Road | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PERCENT TOTAL DISTANCE | | | | | | PERCENT TOTAL DISTANCE | | | | | | PERCENT TOTAL DISTANCE | | | | | | PERCENT TOTAL DISTANCE | | | | | |
| | X=0 | 2 | 4 | 6 | 8 | | X=0 | 2 | 4 | 6 | 8 | | X=0 | 2 | 4 | 6 | 8 | | X=0 | 2 | 4 | 6 | 8 |
| X | 55.0 | 55.0 | 55.0 | 55.0 | 55.0 | X | 55.0 | 53.7 | 52.2 | 51.8 | 51.6 | X | 10.6 | 10.6 | 10.6 | 10.6 | 10.6 | X | 30.2 | 32.4 | 28.3 | 25.6 | 23.5 |
| 1X | 55.0 | 55.0 | 55.0 | 55.0 | 55.0 | 1X | 50.5 | 48.8 | 47.6 | 46.4 | 45.3 | 1X | 10.4 | 10.2 | 10.0 | 9.9 | 9.8 | 1X | 21.8 | 20.4 | 19.3 | 18.3 | 17.5 |
| 2X | 55.0 | 55.0 | 55.0 | 55.0 | 55.0 | 2X | 43.5 | 41.1 | 39.2 | 37.8 | 36.6 | 2X | 9.7 | 9.6 | 9.6 | 9.6 | 9.5 | 2X | 16.8 | 16.3 | 15.9 | 15.4 | 14.9 |
| 3X | 55.0 | 55.0 | 55.0 | 55.0 | 55.0 | 3X | 35.6 | 34.6 | 33.5 | 32.4 | 31.2 | 3X | 9.4 | 9.3 | 9.2 | 9.1 | 9.1 | 3X | 14.5 | 14.1 | 13.7 | 13.3 | 13.0 |
| 4X | 54.8 | 54.0 | 53.3 | 52.7 | 52.1 | 4X | 29.9 | 28.6 | 27.5 | 26.5 | 25.7 | 4X | 9.0 | 8.9 | 8.9 | 8.9 | 8.8 | 4X | 12.7 | 12.4 | 12.1 | 11.9 | 11.7 |
| 5X | 51.5 | 50.8 | 50.0 | 49.1 | 47.9 | 5X | 24.9 | 24.2 | 23.6 | 23.0 | 22.6 | 5X | 8.8 | 8.7 | 8.7 | 8.7 | 8.7 | 5X | 11.4 | 11.3 | 11.1 | 10.9 | 10.7 |
| 6X | 46.8 | 45.6 | 44.6 | 43.7 | 42.8 | 6X | 22.1 | 21.7 | 21.4 | 21.0 | 20.7 | 6X | 8.6 | 8.6 | 8.6 | 8.6 | 8.6 | 6X | 10.5 | 10.3 | 10.2 | 10.0 | 9.8 |
| 7X | 42.1 | 41.4 | 40.8 | 40.0 | 39.3 | 7X | 20.4 | 20.2 | 20.0 | 19.7 | 19.5 | 7X | 8.5 | 8.5 | 8.5 | 8.5 | 8.5 | 7X | 9.6 | 9.4 | 9.2 | 9.0 | 8.8 |
| 8X | 38.3 | 37.5 | 36.7 | 35.8 | 34.7 | 8X | 19.3 | 19.1 | 18.9 | 18.8 | 18.6 | 8X | 8.4 | 8.4 | 8.4 | 8.4 | 8.4 | 8X | 8.6 | 8.3 | 8.1 | 7.6 | 3.1 |
| 9X | 33.7 | 32.8 | 32.0 | 31.2 | 30.0 | 9X | 18.4 | 18.2 | 17.9 | 17.7 | 17.4 | 9X | 8.4 | 8.3 | 8.3 | 8.2 | 8.1 | 9X | 1.9 | 1.3 | 1.1 | 0.9 | 0.8 |
| 10X | 28.9 | | | | | 10X | 17.1 | | | | | 10X | 8.0 | | | | | 10X | 0.7 | | | | |

## Wet Normal Condition

| PERCENT TOTAL DISTANCE | | | | | | PERCENT TOTAL DISTANCE | | | | | | PERCENT TOTAL DISTANCE | | | | | | PERCENT TOTAL DISTANCE | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | X=0 | 2 | 4 | 6 | 8 | | X=0 | 2 | 4 | 6 | 8 | | X=0 | 2 | 4 | 6 | 8 | | X=0 | 2 | 4 | 6 | 8 |
| X | 55.0 | 55.0 | 55.0 | 55.0 | 55.0 | X | 55.0 | 53.7 | 52.2 | 51.8 | 51.6 | X | 10.6 | 10.6 | 10.6 | 10.6 | 10.5 | X | 29.1 | 28.3 | 17.4 | 15.7 | 14.6 |
| 1X | 55.0 | 55.0 | 55.0 | 55.0 | 55.0 | 1X | 50.5 | 48.8 | 47.6 | 46.4 | 45.3 | 1X | 10.2 | 10.0 | 9.9 | 9.8 | 9.7 | 1X | 13.6 | 12.9 | 12.2 | 11.7 | 11.2 |
| 2X | 55.0 | 55.0 | 55.0 | 55.0 | 55.0 | 2X | 43.5 | 41.1 | 39.2 | 37.8 | 36.6 | 2X | 9.6 | 9.6 | 9.5 | 9.4 | 9.3 | 2X | 10.7 | 10.4 | 10.1 | 9.8 | 9.5 |
| 3X | 55.0 | 55.0 | 55.0 | 55.0 | 55.0 | 3X | 35.6 | 34.6 | 33.5 | 32.4 | 31.2 | 3X | 9.2 | 9.1 | 9.0 | 9.0 | 8.9 | 3X | 9.2 | 8.9 | 8.7 | 8.4 | 8.1 |
| 4X | 54.8 | 54.0 | 53.3 | 52.7 | 52.1 | 4X | 29.9 | 28.6 | 27.5 | 26.5 | 25.7 | 4X | 8.9 | 8.8 | 8.8 | 8.7 | 8.7 | 4X | 7.8 | 7.5 | 7.2 | 6.9 | 6.5 |
| 5X | 51.5 | 50.8 | 50.0 | 49.1 | 47.9 | 5X | 24.9 | 24.2 | 23.6 | 23.0 | 22.6 | 5X | 8.7 | 8.7 | 8.6 | 8.6 | 8.6 | 5X | 6.1 | 5.6 | 5.0 | 2.7 | 1.4 |
| 6X | 46.8 | 45.6 | 44.6 | 43.7 | 42.8 | 6X | 22.1 | 21.7 | 21.4 | 21.0 | 20.7 | 6X | 8.6 | 8.5 | 8.5 | 8.5 | 8.5 | 6X | 1.0 | 0.8 | 0.6 | 0.5 | 0.5 |
| 7X | 42.1 | 41.4 | 40.8 | 40.0 | 39.3 | 7X | 20.4 | 20.2 | 20.0 | 19.7 | 19.5 | 7X | 8.4 | 8.4 | 8.4 | 8.4 | 8.4 | 7X | 0.4 | 0.4 | 0.4 | 0.3 | 0.3 |
| 8X | 38.3 | 37.5 | 36.7 | 35.8 | 34.7 | 8X | 19.3 | 19.1 | 18.9 | 18.8 | 18.6 | 8X | 8.4 | 8.3 | 8.3 | 8.3 | 8.3 | 8X | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 |
| 9X | 33.7 | 32.8 | 32.0 | 31.2 | 30.0 | 9X | 18.4 | 18.2 | 17.9 | 17.7 | 17.4 | 9X | 8.3 | 8.2 | 8.2 | 8.1 | 8.0 | 9X | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 |
| 10X | 28.9 | | | | | 10X | 17.1 | | | | | 10X | 7.9 | | | | | 10X | 0.2 | | | | |

## Wet-Wet Slippery Condition

| PERCENT TOTAL DISTANCE | | | | | | PERCENT TOTAL DISTANCE | | | | | | PERCENT TOTAL DISTANCE | | | | | | PERCENT TOTAL DISTANCE | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | X=0 | 2 | 4 | 6 | 8 | | X=0 | 2 | 4 | 6 | 8 | | X=0 | 2 | 4 | 6 | 8 | | X=0 | 2 | 4 | 6 | 8 |
| X | 55.0 | 55.0 | 55.0 | 55.0 | 55.0 | X | 50.7 | 50.0 | 49.2 | 48.9 | 48.8 | X | 10.6 | 10.6 | 10.6 | 10.5 | 10.3 | X | 22.3 | 16.8 | 14.8 | 13.8 | 13.0 |
| 1X | 55.0 | 55.0 | 55.0 | 55.0 | 55.0 | 1X | 47.8 | 46.2 | 45.2 | 44.2 | 43.1 | 1X | 10.0 | 9.9 | 9.8 | 9.7 | 9.6 | 1X | 12.2 | 11.5 | 11.0 | 10.5 | 10.0 |
| 2X | 55.0 | 55.0 | 55.0 | 55.0 | 55.0 | 2X | 41.3 | 39.2 | 37.5 | 36.2 | 35.1 | 2X | 9.5 | 9.4 | 9.2 | 9.1 | 9.0 | 2X | 9.6 | 9.3 | 8.9 | 8.5 | 8.1 |
| 3X | 55.0 | 55.0 | 55.0 | 55.0 | 55.0 | 3X | 34.2 | 33.2 | 32.1 | 31.0 | 29.9 | 3X | 9.0 | 8.9 | 8.8 | 8.8 | 8.7 | 3X | 7.8 | 7.4 | 7.0 | 6.5 | 5.6 |
| 4X | 54.5 | 53.7 | 53.0 | 52.4 | 51.9 | 4X | 28.7 | 27.5 | 26.5 | 25.6 | 24.9 | 4X | 8.7 | 8.7 | 8.6 | 8.6 | 8.6 | 4X | 1.6 | 0.9 | 0.7 | 0.5 | 0.5 |
| 5X | 51.1 | 50.3 | 49.5 | 48.3 | 47.0 | 5X | 24.2 | 23.5 | 23.0 | 22.5 | 22.0 | 5X | 8.6 | 8.5 | 8.5 | 8.5 | 8.5 | 5X | 0.4 | 0.4 | 0.3 | 0.3 | 0.3 |
| 6X | 45.8 | 44.7 | 43.8 | 42.9 | 42.1 | 6X | 21.6 | 21.2 | 20.9 | 20.6 | 20.3 | 6X | 8.4 | 8.4 | 8.4 | 8.4 | 8.4 | 6X | 0.3 | 0.3 | 0.2 | 0.2 | 0.2 |
| 7X | 41.4 | 40.7 | 40.1 | 39.2 | 38.4 | 7X | 20.1 | 19.8 | 19.6 | 19.4 | 19.2 | 7X | 8.3 | 8.3 | 8.3 | 8.3 | 8.3 | 7X | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 |
| 8X | 37.5 | 36.7 | 35.8 | 34.8 | 33.8 | 8X | 19.0 | 18.8 | 18.7 | 18.5 | 18.3 | 8X | 8.2 | 8.2 | 8.2 | 8.2 | 8.1 | 8X | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 |
| 9X | 32.9 | 32.0 | 31.3 | 30.4 | 29.2 | 9X | 18.2 | 17.9 | 17.7 | 17.4 | 17.1 | 9X | 8.1 | 8.1 | 8.0 | 7.8 | 7.6 | 9X | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 |
| 10X | 28.0 | | | | | 10X | 16.8 | | | | | 10X | 3.5 | | | | | 10X | 0.2 | | | | |

## Snow Condition

| PERCENT TOTAL DISTANCE | | | | | | PERCENT TOTAL DISTANCE | | | | | | PERCENT TOTAL DISTANCE | | | | | | PERCENT TOTAL DISTANCE | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | X=0 | 2 | 4 | 6 | 8 | | X=0 | 2 | 4 | 6 | 8 | | X=0 | 2 | 4 | 6 | 8 | | X=0 | 2 | 4 | 6 | 8 |
| X | 40.5 | 40.5 | 40.5 | 40.5 | 40.5 | X | 37.1 | 37.1 | 37.1 | 37.1 | 37.1 | X | 6.9 | 6.9 | 6.8 | 6.7 | 6.7 | X | 6.9 | 6.8 | 6.7 | 6.7 | 6.6 |
| 1X | 40.5 | 40.5 | 40.5 | 40.5 | 40.5 | 1X | 36.7 | 36.1 | 35.7 | 35.2 | 34.5 | 1X | 6.6 | 6.6 | 6.6 | 6.6 | 6.6 | 1X | 6.6 | 6.6 | 6.5 | 6.5 | 6.4 |
| 2X | 40.5 | 40.5 | 40.5 | 40.5 | 40.5 | 2X | 33.2 | 31.8 | 30.7 | 29.8 | 29.1 | 2X | 6.5 | 6.5 | 6.5 | 6.5 | 6.5 | 2X | 6.4 | 6.4 | 6.3 | 6.3 | 6.2 |
| 3X | 40.5 | 40.5 | 40.5 | 40.5 | 40.5 | 3X | 28.4 | 27.7 | 27.0 | 26.0 | 25.8 | 3X | 6.5 | 6.5 | 6.5 | 6.5 | 6.5 | 3X | 6.2 | 6.1 | 6.1 | 6.0 | 6.0 |
| 4X | 40.2 | 39.9 | 39.6 | 39.3 | 39.1 | 4X | 24.2 | 23.5 | 22.9 | 22.3 | 21.8 | 4X | 6.5 | 6.5 | 6.5 | 6.4 | 6.4 | 4X | 5.9 | 5.9 | 5.9 | 5.8 | 5.8 |
| 5X | 38.7 | 38.3 | 37.5 | 36.7 | 35.9 | 5X | 21.3 | 20.9 | 20.5 | 20.2 | 19.9 | 5X | 6.4 | 6.4 | 6.4 | 6.4 | 6.4 | 5X | 5.7 | 5.7 | 5.6 | 5.6 | 5.5 |
| 6X | 35.3 | 34.7 | 34.1 | 33.7 | 33.2 | 6X | 19.7 | 19.4 | 19.2 | 19.0 | 18.8 | 6X | 6.4 | 6.4 | 6.4 | 6.4 | 6.4 | 6X | 5.5 | 5.4 | 5.4 | 5.3 | 5.3 |
| 7X | 32.7 | 32.2 | 31.7 | 31.2 | 30.6 | 7X | 18.6 | 18.4 | 18.2 | 18.1 | 17.9 | 7X | 6.4 | 6.3 | 6.3 | 6.3 | 6.2 | 7X | 5.2 | 5.1 | 5.0 | 3.4 | 1.8 |
| 8X | 30.1 | 29.4 | 28.7 | 28.1 | 27.6 | 8X | 17.8 | 17.7 | 17.5 | 17.4 | 17.2 | 8X | 6.2 | 6.1 | 6.1 | 6.1 | 6.0 | 8X | 1.3 | 1.0 | 0.8 | 0.7 | 0.6 |
| 9X | 27.1 | 26.5 | 25.8 | 25.0 | 24.1 | 9X | 16.9 | 16.7 | 16.5 | 16.2 | 15.9 | 9X | 6.0 | 6.0 | 5.9 | 5.9 | 5.8 | 9X | 0.6 | 0.5 | 0.5 | 0.4 | 0.4 |
| 10X | 22.8 | | | | | 10X | 15.4 | | | | | 10X | 5.7 | | | | | 10X | 0.4 | | | | |

Table B3

Speed Profiles (mph) for Vehicle 3 in Schotten Quad (L5520) for Roads and Lauterbach Quad (L5322) for Off-Roads in the Federal Republic of Germany

## Dry Condition

| Primary Roads | | | | | Secondary Roads | | | | | Trails | | | | | Off-Road | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PERCENT TOTAL DISTANCE | | | | | PERCENT TOTAL DISTANCE | | | | | PERCENT TOTAL DISTANCE | | | | | PERCENT TOTAL DISTANCE | | | | |
| | X=0 | 2 | 4 | 6 | 8 | X=0 | 2 | 4 | 6 | 8 | X=0 | 2 | 4 | 6 | 8 | X=0 | 2 | 4 | 6 | 8 |
| X | 55.0 | 55.0 | 55.0 | 55.0 | 55.0 | 43.9 | 43.9 | 43.9 | 43.9 | 43.9 | 20.5 | 20.5 | 20.5 | 20.3 | 19.9 | 50.6 | 32.9 | 30.2 | 28.4 | 27.2 |
| 1X | 55.0 | 55.0 | 55.0 | 55.0 | 55.0 | 43.8 | 43.3 | 42.4 | 41.6 | 40.9 | 19.2 | 18.7 | 18.4 | 18.2 | 18.0 | 26.2 | 25.4 | 24.7 | 24.1 | 23.6 |
| 2X | 53.9 | 52.8 | 51.9 | 51.2 | 50.6 | 39.8 | 38.8 | 37.7 | 36.8 | 35.9 | 17.8 | 17.7 | 17.6 | 17.4 | 16.9 | 23.1 | 22.6 | 22.2 | 21.7 | 21.3 |
| 3X | 50.1 | 49.6 | 49.3 | 48.9 | 48.6 | 35.1 | 34.3 | 33.5 | 32.9 | 32.3 | 16.5 | 16.1 | 15.8 | 15.6 | 15.3 | 20.8 | 20.4 | 20.0 | 19.6 | 19.2 |
| 4X | 48.4 | 48.1 | 47.8 | 47.5 | 47.3 | 31.8 | 31.4 | 31.0 | 30.7 | 30.4 | 15.0 | 14.5 | 13.9 | 13.4 | 13.0 | 18.8 | 18.4 | 18.0 | 17.5 | 17.1 |
| 5X | 46.9 | 46.5 | 46.0 | 45.5 | 45.0 | 30.1 | 29.8 | 29.6 | 29.3 | 29.0 | 12.6 | 12.3 | 12.0 | 11.8 | 11.5 | 16.6 | 16.2 | 15.8 | 15.4 | 15.0 |
| 6X | 44.6 | 44.2 | 43.6 | 43.2 | 42.7 | 28.8 | 28.5 | 28.3 | 28.0 | 27.7 | 11.3 | 11.2 | 11.0 | 10.8 | 10.7 | 14.5 | 14.1 | 13.6 | 13.2 | 12.8 |
| 7X | 42.3 | 41.9 | 41.4 | 40.8 | 40.1 | 27.5 | 27.2 | 27.0 | 26.7 | 26.4 | 10.6 | 10.4 | 10.3 | 10.2 | 10.0 | 12.4 | 12.0 | 11.6 | 11.2 | 10.8 |
| 8X | 39.2 | 38.3 | 37.4 | 36.5 | 35.5 | 26.1 | 25.8 | 25.4 | 25.1 | 24.7 | 9.9 | 9.7 | 9.6 | 9.5 | 9.4 | 10.4 | 10.1 | 9.7 | 9.3 | 8.9 |
| 9X | 34.4 | 33.5 | 32.6 | 31.7 | 30.5 | 24.4 | 24.0 | 23.6 | 23.1 | 22.5 | 9.3 | 9.2 | 9.1 | 9.0 | 8.8 | 8.5 | 7.9 | 3.6 | 2.1 | 1.5 |
| 10X | 29.3 | | | | | 21.9 | | | | | 8.7 | | | | | 1.2 | | | | |

## Wet Normal Condition

| PERCENT TOTAL DISTANCE | | | | | | PERCENT TOTAL DISTANCE | | | | | PERCENT TOTAL DISTANCE | | | | | PERCENT TOTAL DISTANCE | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | X=0 | 2 | 4 | 6 | 8 | X=0 | 2 | 4 | 6 | 8 | X=0 | 2 | 4 | 6 | 8 | X=0 | 2 | 4 | 6 | 8 |
| X | 55.0 | 55.0 | 55.0 | 55.0 | 55.0 | 43.9 | 43.9 | 43.9 | 43.9 | 43.9 | 20.5 | 20.4 | 19.7 | 19.1 | 18.4 | 30.8 | 23.9 | 22.3 | 21.1 | 20.1 |
| 1X | 55.0 | 55.0 | 55.0 | 55.0 | 55.0 | 43.8 | 43.3 | 42.4 | 41.6 | 40.9 | 18.1 | 17.8 | 17.6 | 17.3 | 17.1 | 19.3 | 18.5 | 17.7 | 16.9 | 16.2 |
| 2X | 53.9 | 52.8 | 51.9 | 51.2 | 50.6 | 39.8 | 38.8 | 37.7 | 36.8 | 35.9 | 16.9 | 16.7 | 16.5 | 16.2 | 15.9 | 15.4 | 14.7 | 14.0 | 13.4 | 12.8 |
| 3X | 50.1 | 49.6 | 49.3 | 48.9 | 48.6 | 35.1 | 34.3 | 33.5 | 32.9 | 32.3 | 15.5 | 15.3 | 15.0 | 14.8 | 14.6 | 12.2 | 11.6 | 11.1 | 10.6 | 10.1 |
| 4X | 48.4 | 48.1 | 47.8 | 47.5 | 47.3 | 31.8 | 31.4 | 31.0 | 30.7 | 30.4 | 14.2 | 13.8 | 13.3 | 12.9 | 12.5 | 9.6 | 9.1 | 8.6 | 8.1 | 7.6 |
| 5X | 46.9 | 46.5 | 46.0 | 45.5 | 45.0 | 30.1 | 29.8 | 29.6 | 29.3 | 29.0 | 12.2 | 11.9 | 11.6 | 11.4 | 11.2 | 6.9 | 3.4 | 1.5 | 1.0 | 0.8 |
| 6X | 44.6 | 44.2 | 43.6 | 43.2 | 42.7 | 28.8 | 28.5 | 28.3 | 28.0 | 27.7 | 11.0 | 10.9 | 10.7 | 10.6 | 10.4 | 0.6 | 0.5 | 0.5 | 0.4 | 0.4 |
| 7X | 42.3 | 41.9 | 41.4 | 40.8 | 40.1 | 27.5 | 27.2 | 27.0 | 26.7 | 26.4 | 10.3 | 10.2 | 10.1 | 9.9 | 9.8 | 0.4 | 0.3 | 0.3 | 0.3 | 0.3 |
| 8X | 39.2 | 38.3 | 37.4 | 36.5 | 35.5 | 26.1 | 25.8 | 25.4 | 25.1 | 24.7 | 9.7 | 9.5 | 9.4 | 9.3 | 9.2 | 0.3 | 0.3 | 0.3 | 0.2 | 0.2 |
| 9X | 34.4 | 33.5 | 32.6 | 31.7 | 30.5 | 24.4 | 24.0 | 23.6 | 23.1 | 22.5 | 9.1 | 9.0 | 9.0 | 8.8 | 8.7 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 |
| 10X | 29.3 | | | | | 21.9 | | | | | 8.5 | | | | | 0.2 | | | | |

## Wet-Wet Slippery Condition

| PERCENT TOTAL DISTANCE | | | | | | PERCENT TOTAL DISTANCE | | | | | PERCENT TOTAL DISTANCE | | | | | PERCENT TOTAL DISTANCE | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | X=0 | 2 | 4 | 6 | 8 | X=0 | 2 | 4 | 6 | 8 | X=0 | 2 | 4 | 6 | 8 | X=0 | 2 | 4 | 6 | 8 |
| X | 55.0 | 55.0 | 55.0 | 55.0 | 55.0 | 43.9 | 43.9 | 43.9 | 43.9 | 43.9 | 20.5 | 20.1 | 19.2 | 18.4 | 17.9 | 24.8 | 21.1 | 19.0 | 17.9 | 17.0 |
| 1X | 55.0 | 55.0 | 55.0 | 55.0 | 54.8 | 43.7 | 43.2 | 42.3 | 41.5 | 40.7 | 17.7 | 17.3 | 17.0 | 16.7 | 16.5 | 16.1 | 15.6 | 14.6 | 13.9 | 13.1 |
| 2X | 53.6 | 52.6 | 51.7 | 51.0 | 50.4 | 39.7 | 38.5 | 37.4 | 36.5 | 35.6 | 16.2 | 15.9 | 15.7 | 15.4 | 15.1 | 12.4 | 11.7 | 11.0 | 10.3 | 9.7 |
| 3X | 49.9 | 49.5 | 49.1 | 48.8 | 48.5 | 34.8 | 34.0 | 33.3 | 32.7 | 32.1 | 14.8 | 14.6 | 14.4 | 14.2 | 13.9 | 9.1 | 8.6 | 8.0 | 7.4 | 6.3 |
| 4X | 48.3 | 48.0 | 47.7 | 47.4 | 47.2 | 31.7 | 31.2 | 30.9 | 30.5 | 30.3 | 13.6 | 13.1 | 12.6 | 12.3 | 12.0 | 1.7 | 1.0 | 0.7 | 0.6 | 0.5 |
| 5X | 46.7 | 46.1 | 45.6 | 45.2 | 44.7 | 30.0 | 29.7 | 29.4 | 29.1 | 28.8 | 11.7 | 11.4 | 11.2 | 11.0 | 10.8 | 0.4 | 0.4 | 0.3 | 0.3 | 0.3 |
| 6X | 44.3 | 43.8 | 43.3 | 42.8 | 42.4 | 28.5 | 28.3 | 28.0 | 27.7 | 27.5 | 10.7 | 10.5 | 10.4 | 10.3 | 10.2 | 0.3 | 0.3 | 0.2 | 0.2 | 0.2 |
| 7X | 42.0 | 41.5 | 40.8 | 40.1 | 39.2 | 27.2 | 26.9 | 26.7 | 26.4 | 26.1 | 10.1 | 9.9 | 9.8 | 9.7 | 9.5 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 |
| 8X | 38.3 | 37.5 | 36.6 | 35.5 | 34.5 | 25.8 | 25.4 | 25.0 | 24.6 | 24.3 | 9.4 | 9.3 | 9.2 | 9.1 | 9.0 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 |
| 9X | 33.5 | 32.7 | 31.9 | 30.9 | 29.7 | 24.0 | 23.7 | 23.5 | 22.7 | 22.1 | 8.9 | 8.8 | 8.7 | 8.5 | 8.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 |
| 10X | 28.4 | | | | | 21.4 | | | | | 3.7 | | | | | 0.2 | | | | |

## Snow Condition

| PERCENT TOTAL DISTANCE | | | | | | PERCENT TOTAL DISTANCE | | | | | PERCENT TOTAL DISTANCE | | | | | PERCENT TOTAL DISTANCE | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | X=0 | 2 | 4 | 6 | 8 | X=0 | 2 | 4 | 6 | 8 | X=0 | 2 | 4 | 6 | 8 | X=0 | 2 | 4 | 6 | 8 |
| X | 40.5 | 40.5 | 40.5 | 40.5 | 40.5 | 37.1 | 37.1 | 37.1 | 37.1 | 37.1 | 20.5 | 19.7 | 18.8 | 18.1 | 17.7 | 22.2 | 20.5 | 19.8 | 19.3 | 18.9 |
| 1X | 40.5 | 40.5 | 40.5 | 40.5 | 40.5 | 37.1 | 36.8 | 36.4 | 35.9 | 35.3 | 17.5 | 17.2 | 16.8 | 16.4 | 16.1 | 18.4 | 18.0 | 17.7 | 17.4 | 17.1 |
| 2X | 40.5 | 40.5 | 40.5 | 40.5 | 40.5 | 34.6 | 33.7 | 32.8 | 32.1 | 31.4 | 15.8 | 15.6 | 15.4 | 15.1 | 14.8 | 16.9 | 16.6 | 16.3 | 16.1 | 15.8 |
| 3X | 40.5 | 40.5 | 40.5 | 40.5 | 40.5 | 30.9 | 30.4 | 30.0 | 29.7 | 29.3 | 14.6 | 14.4 | 14.3 | 14.1 | 13.8 | 15.6 | 15.3 | 15.1 | 14.9 | 14.6 |
| 4X | 40.4 | 40.2 | 40.0 | 39.7 | 39.5 | 29.1 | 28.8 | 28.6 | 28.4 | 28.1 | 13.4 | 13.0 | 12.5 | 12.2 | 11.9 | 14.4 | 14.1 | 13.8 | 13.5 | 13.2 |
| 5X | 39.1 | 38.7 | 38.2 | 37.8 | 37.5 | 27.9 | 27.7 | 27.4 | 27.2 | 27.0 | 11.6 | 11.4 | 11.2 | 11.0 | 10.8 | 12.9 | 12.6 | 12.3 | 12.1 | 11.8 |
| 6X | 37.1 | 36.8 | 36.5 | 36.3 | 35.9 | 26.7 | 26.5 | 26.2 | 26.0 | 25.7 | 10.6 | 10.5 | 10.4 | 10.2 | 10.1 | 11.5 | 11.2 | 10.9 | 10.6 | 10.3 |
| 7X | 35.4 | 34.4 | 34.1 | 33.5 | 32.8 | 25.5 | 25.1 | 24.8 | 24.4 | 24.0 | 10.0 | 9.9 | 9.8 | 9.6 | 9.5 | 10.0 | 9.7 | 9.4 | 9.0 | 8.7 |
| 8X | 32.1 | 31.3 | 30.5 | 29.8 | 29.2 | 23.7 | 23.4 | 23.1 | 22.7 | 22.4 | 9.4 | 9.3 | 9.2 | 9.1 | 9.0 | 8.4 | 8.1 | 3.9 | 2.1 | 1.4 |
| 9X | 28.6 | 28.0 | 27.1 | 26.2 | 25.1 | 22.0 | 21.6 | 21.1 | 20.6 | 19.9 | 8.9 | 8.8 | 8.7 | 8.6 | 8.4 | 1.1 | 0.9 | 0.8 | 0.7 | 0.6 |
| 10X | 23.7 | | | | | 19.8 | | | | | 8.2 | | | | | 0.6 | | | | |

Table B4

Speed Profiles (mph) for Vehicle 4 in Schotten Quad (L5520) for Roads and Lauterbach Quad (L5322) for Off-Roads in the Federal Republic of Germany

## Dry Condition

### Primary Roads

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 50.0 | 50.0 | 50.0 | 50.0 | 50.0 |
| 1X | 50.0 | 50.0 | 50.0 | 50.0 | 50.0 |
| 2X | 50.0 | 50.0 | 50.0 | 50.0 | 50.0 |
| 3X | 50.0 | 50.0 | 50.0 | 50.0 | 50.0 |
| 4X | 50.0 | 50.0 | 49.9 | 49.8 | 49.7 |
| 5X | 49.5 | 49.1 | 48.7 | 48.2 | 47.7 |
| 6X | 47.3 | 46.9 | 46.6 | 46.3 | 46.0 |
| 7X | 45.6 | 45.2 | 44.5 | 43.9 | 43.0 |
| 8X | 41.9 | 40.8 | 39.8 | 38.7 | 37.4 |
| 9X | 36.2 | 35.2 | 34.2 | 33.2 | 31.8 |
| 10X | 30.5 | | | | |

### Secondary Roads

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 50.0 | 50.0 | 50.0 | 50.0 | 50.0 |
| 1X | 50.0 | 49.8 | 49.5 | 49.0 | 48.4 |
| 2X | 47.2 | 46.1 | 45.1 | 44.2 | 43.4 |
| 3X | 42.5 | 41.5 | 40.1 | 38.6 | 37.2 |
| 4X | 35.7 | 34.0 | 32.2 | 30.7 | 29.4 |
| 5X | 28.3 | 27.2 | 26.3 | 25.5 | 24.8 |
| 6X | 24.2 | 23.7 | 23.2 | 22.7 | 22.3 |
| 7X | 22.0 | 21.6 | 21.3 | 21.0 | 20.8 |
| 8X | 20.5 | 20.3 | 20.1 | 19.9 | 19.7 |
| 9X | 19.5 | 19.4 | 19.2 | 18.9 | 18.6 |
| 10X | 18.2 | | | | |

### Trails

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 10.6 | 10.6 | 10.6 | 10.6 | 10.6 |
| 1X | 10.5 | 10.2 | 10.1 | 9.9 | 9.8 |
| 2X | 9.7 | 9.7 | 9.6 | 9.6 | 9.5 |
| 3X | 9.4 | 9.3 | 9.2 | 9.2 | 9.1 |
| 4X | 9.0 | 9.0 | 8.9 | 8.9 | 8.8 |
| 5X | 8.8 | 8.8 | 8.7 | 8.7 | 8.7 |
| 6X | 8.7 | 8.6 | 8.6 | 8.6 | 8.6 |
| 7X | 8.6 | 8.5 | 8.5 | 8.5 | 8.5 |
| 8X | 8.5 | 8.4 | 8.4 | 8.4 | 8.4 |
| 9X | 8.4 | 8.4 | 8.4 | 8.3 | 8.2 |
| 10X | 8.1 | | | | |

### Off-Road

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 49.7 | 39.8 | 35.8 | 32.3 | 28.2 |
| 1X | 24.4 | 22.8 | 20.6 | 19.5 | 18.7 |
| 2X | 18.1 | 17.5 | 16.9 | 16.4 | 16.0 |
| 3X | 15.5 | 15.0 | 14.6 | 14.3 | 13.9 |
| 4X | 13.5 | 13.2 | 12.9 | 12.6 | 12.3 |
| 5X | 12.1 | 11.9 | 11.7 | 11.5 | 11.3 |
| 6X | 11.1 | 10.9 | 10.7 | 10.5 | 10.3 |
| 7X | 10.1 | 9.9 | 9.8 | 9.6 | 9.4 |
| 8X | 9.2 | 9.0 | 8.8 | 8.6 | 8.3 |
| 9X | 7.9 | 6.7 | 3.0 | 1.9 | 1.4 |
| 10X | 1.1 | | | | |

## Wet Normal Condition

### Primary Roads

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 50.0 | 50.0 | 50.0 | 50.0 | 50.0 |
| 1X | 50.0 | 50.0 | 50.0 | 50.0 | 50.0 |
| 2X | 50.0 | 50.0 | 50.0 | 50.0 | 50.0 |
| 3X | 50.0 | 50.0 | 50.0 | 50.0 | 50.0 |
| 4X | 50.0 | 50.0 | 49.9 | 49.8 | 49.7 |
| 5X | 49.5 | 49.1 | 48.7 | 48.2 | 47.7 |
| 6X | 47.3 | 46.9 | 46.6 | 46.3 | 46.0 |
| 7X | 45.6 | 45.2 | 44.5 | 43.9 | 43.0 |
| 8X | 41.9 | 40.8 | 39.8 | 38.7 | 37.4 |
| 9X | 36.2 | 35.2 | 34.2 | 33.2 | 31.8 |
| 10X | 30.5 | | | | |

### Secondary Roads

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 50.0 | 50.0 | 50.0 | 50.0 | 50.0 |
| 1X | 50.0 | 49.8 | 49.5 | 49.0 | 48.4 |
| 2X | 47.2 | 46.1 | 45.1 | 44.2 | 43.4 |
| 3X | 42.5 | 41.5 | 40.1 | 38.6 | 37.2 |
| 4X | 35.7 | 34.0 | 32.2 | 30.7 | 29.4 |
| 5X | 28.3 | 27.2 | 26.3 | 25.5 | 24.8 |
| 6X | 24.2 | 23.7 | 23.2 | 22.7 | 22.3 |
| 7X | 22.0 | 21.6 | 21.3 | 21.0 | 20.8 |
| 8X | 20.5 | 20.3 | 20.1 | 19.9 | 19.7 |
| 9X | 19.5 | 19.4 | 19.2 | 18.9 | 18.6 |
| 10X | 18.2 | | | | |

### Trails

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 10.6 | 10.6 | 10.6 | 10.6 | 10.6 |
| 1X | 10.5 | 10.2 | 10.1 | 9.9 | 9.8 |
| 2X | 9.7 | 9.7 | 9.6 | 9.6 | 9.5 |
| 3X | 9.4 | 9.3 | 9.2 | 9.1 | 9.1 |
| 4X | 9.0 | 9.0 | 8.9 | 8.9 | 8.8 |
| 5X | 8.8 | 8.8 | 8.7 | 8.7 | 8.7 |
| 6X | 8.7 | 8.6 | 8.6 | 8.6 | 8.6 |
| 7X | 8.6 | 8.5 | 8.5 | 8.5 | 8.5 |
| 8X | 8.5 | 8.4 | 8.4 | 8.4 | 8.4 |
| 9X | 8.4 | 8.4 | 8.4 | 8.3 | 8.2 |
| 10X | 8.0 | | | | |

### Off-Road

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 43.3 | 30.2 | 23.3 | 19.6 | 17.9 |
| 1X | 16.7 | 15.8 | 15.2 | 14.5 | 13.9 |
| 2X | 13.3 | 12.8 | 12.4 | 12.0 | 11.7 |
| 3X | 11.4 | 11.1 | 10.9 | 10.7 | 10.5 |
| 4X | 10.3 | 10.1 | 9.9 | 9.7 | 9.6 |
| 5X | 9.4 | 9.3 | 9.1 | 9.0 | 8.9 |
| 6X | 8.7 | 8.6 | 8.4 | 8.3 | 8.1 |
| 7X | 8.0 | 7.8 | 7.7 | 7.4 | 7.2 |
| 8X | 6.5 | 2.8 | 1.7 | 1.2 | 1.0 |
| 9X | 0.8 | 0.7 | 0.6 | 0.6 | 0.5 |
| 10X | 0.5 | | | | |

## Wet-Wet Slippery Condition

### Primary Roads

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 50.0 | 50.0 | 50.0 | 50.0 | 50.0 |
| 1X | 50.0 | 50.0 | 50.0 | 50.0 | 50.0 |
| 2X | 50.0 | 50.0 | 50.0 | 50.0 | 50.0 |
| 3X | 50.0 | 50.0 | 50.0 | 50.0 | 50.0 |
| 4X | 50.0 | 50.0 | 49.9 | 49.8 | 49.7 |
| 5X | 49.5 | 49.0 | 48.5 | 48.0 | 47.6 |
| 6X | 47.2 | 46.8 | 46.4 | 46.1 | 45.8 |
| 7X | 45.6 | 44.7 | 43.9 | 43.1 | 42.0 |
| 8X | 40.9 | 39.9 | 38.8 | 37.6 | 36.6 |
| 9X | 35.3 | 34.2 | 33.5 | 32.3 | 31.0 |
| 10X | 29.5 | | | | |

### Secondary Roads

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 50.0 | 50.0 | 50.0 | 50.0 | 50.0 |
| 1X | 50.0 | 49.8 | 49.5 | 49.0 | 48.2 |
| 2X | 47.0 | 45.9 | 45.0 | 44.0 | 43.2 |
| 3X | 42.3 | 41.1 | 39.6 | 38.0 | 36.4 |
| 4X | 34.9 | 33.1 | 31.4 | 30.0 | 28.8 |
| 5X | 27.7 | 26.7 | 25.9 | 25.1 | 24.4 |
| 6X | 23.9 | 23.3 | 22.9 | 22.4 | 22.1 |
| 7X | 21.7 | 21.4 | 21.1 | 20.8 | 20.6 |
| 8X | 20.3 | 20.1 | 19.9 | 19.7 | 19.6 |
| 9X | 19.4 | 19.2 | 19.0 | 18.7 | 18.4 |
| 10X | 17.9 | | | | |

### Trails

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 10.6 | 10.6 | 10.6 | 10.6 | 10.6 |
| 1X | 10.4 | 10.2 | 10.0 | 9.9 | 9.8 |
| 2X | 9.7 | 9.7 | 9.6 | 9.6 | 9.5 |
| 3X | 9.4 | 9.3 | 9.2 | 9.1 | 9.1 |
| 4X | 9.0 | 8.9 | 8.9 | 8.8 | 8.8 |
| 5X | 8.8 | 8.7 | 8.7 | 8.7 | 8.6 |
| 6X | 8.6 | 8.6 | 8.6 | 8.6 | 8.5 |
| 7X | 8.5 | 8.5 | 8.5 | 8.5 | 8.5 |
| 8X | 8.4 | 8.4 | 8.4 | 8.4 | 8.4 |
| 9X | 8.4 | 8.3 | 8.2 | 8.1 | 7.9 |
| 10X | 7.7 | | | | |

### Off-Road

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 32.7 | 20.3 | 17.0 | 15.6 | 14.7 |
| 1X | 14.0 | 13.4 | 12.9 | 12.3 | 11.8 |
| 2X | 11.4 | 11.0 | 10.7 | 10.4 | 10.2 |
| 3X | 10.0 | 9.8 | 9.6 | 9.4 | 9.2 |
| 4X | 9.0 | 8.8 | 8.7 | 8.5 | 8.4 |
| 5X | 8.2 | 8.1 | 7.9 | 7.8 | 7.6 |
| 6X | 7.4 | 7.3 | 7.1 | 6.7 | 5.1 |
| 7X | 1.7 | 1.2 | 0.9 | 0.7 | 0.6 |
| 8X | 0.6 | 0.5 | 0.5 | 0.4 | 0.4 |
| 9X | 0.4 | 0.4 | 0.3 | 0.3 | 0.3 |
| 10X | 0.3 | | | | |

## Snow Condition

### Primary Roads

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 40.5 | 40.5 | 40.5 | 40.5 | 40.5 |
| 1X | 40.5 | 40.5 | 40.5 | 40.5 | 40.5 |
| 2X | 40.5 | 40.5 | 40.5 | 40.5 | 40.5 |
| 3X | 40.5 | 40.5 | 40.5 | 40.5 | 40.5 |
| 4X | 40.5 | 40.5 | 40.5 | 40.5 | 40.3 |
| 5X | 40.1 | 39.8 | 39.5 | 39.2 | 38.9 |
| 6X | 38.6 | 38.4 | 38.2 | 38.0 | 37.6 |
| 7X | 37.1 | 36.3 | 35.5 | 34.8 | 34.1 |
| 8X | 33.3 | 32.4 | 31.5 | 30.8 | 30.0 |
| 9X | 29.4 | 28.7 | 27.8 | 26.9 | 25.7 |
| 10X | 24.2 | | | | |

### Secondary Roads

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 37.1 | 37.1 | 37.1 | 37.1 | 37.1 |
| 1X | 37.1 | 37.1 | 37.1 | 37.1 | 36.8 |
| 2X | 36.3 | 35.7 | 35.2 | 34.6 | 34.2 |
| 3X | 33.6 | 32.6 | 31.6 | 30.4 | 29.2 |
| 4X | 28.0 | 26.8 | 25.9 | 25.1 | 24.3 |
| 5X | 23.6 | 23.0 | 22.5 | 22.0 | 21.6 |
| 6X | 21.2 | 20.9 | 20.6 | 20.3 | 20.0 |
| 7X | 19.8 | 19.6 | 19.4 | 19.2 | 19.0 |
| 8X | 18.9 | 18.7 | 18.6 | 18.4 | 18.3 |
| 9X | 18.1 | 17.8 | 17.6 | 17.3 | 16.8 |
| 10X | 16.3 | | | | |

### Trails

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 10.6 | 10.4 | 10.1 | 9.8 | 9.6 |
| 1X | 9.5 | 9.3 | 9.1 | 9.0 | 8.8 |
| 2X | 8.7 | 8.7 | 8.6 | 8.6 | 8.5 |
| 3X | 8.5 | 8.5 | 8.4 | 8.4 | 8.3 |
| 4X | 8.3 | 8.3 | 8.3 | 8.2 | 8.2 |
| 5X | 8.2 | 8.1 | 8.1 | 8.1 | 8.1 |
| 6X | 8.0 | 8.0 | 8.0 | 7.9 | 7.9 |
| 7X | 7.9 | 7.8 | 7.8 | 7.8 | 7.7 |
| 8X | 7.7 | 7.7 | 7.7 | 7.7 | 7.6 |
| 9X | 7.6 | 7.6 | 7.5 | 7.4 | 7.3 |
| 10X | 7.2 | | | | |

### Off-Road

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 10.5 | 10.1 | 10.0 | 9.8 | 9.7 |
| 1X | 9.5 | 9.4 | 9.3 | 9.2 | 9.1 |
| 2X | 9.0 | 9.0 | 8.9 | 8.8 | 8.7 |
| 3X | 8.7 | 8.6 | 8.5 | 8.4 | 8.4 |
| 4X | 8.3 | 8.2 | 8.2 | 8.1 | 8.0 |
| 5X | 7.9 | 7.9 | 7.8 | 7.7 | 7.6 |
| 6X | 7.6 | 7.5 | 7.4 | 7.3 | 7.2 |
| 7X | 7.1 | 7.0 | 6.8 | 5.9 | 2.4 |
| 8X | 1.5 | 1.1 | 0.9 | 0.8 | 0.7 |
| 9X | 0.6 | 0.5 | 0.5 | 0.5 | 0.4 |
| 10X | 0.4 | | | | |

Table B5

Speed Profiles (mph) for Vehicle 5 in Schotten Quad (L5520) for Roads and Lauterbach Quad (L5322) for Off-Roads in the Federal Republic of Germany

## Dry Condition

### Primary Roads

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 32.0 | 32.0 | 32.0 | 32.0 | 32.0 |
| 1X | 32.0 | 32.0 | 32.0 | 32.0 | 32.0 |
| 2X | 32.0 | 32.0 | 32.0 | 32.0 | 32.0 |
| 3X | 32.0 | 32.0 | 32.0 | 32.0 | 32.0 |
| 4X | 32.0 | 32.0 | 31.9 | 31.7 | 31.4 |
| 5X | 31.1 | 30.8 | 30.5 | 30.3 | 30.0 |
| 6X | 29.7 | 29.5 | 29.3 | 29.0 | 28.8 |
| 7X | 28.6 | 28.4 | 28.3 | 28.1 | 28.0 |
| 8X | 27.7 | 27.4 | 27.2 | 26.8 | 26.4 |
| 9X | 26.0 | 25.5 | 25.2 | 24.8 | 24.1 |
| 10X | 23.5 | | | | |

### Secondary Roads

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 32.0 | 32.0 | 31.8 | 31.6 | 31.5 |
| 1X | 31.4 | 31.4 | 31.4 | 31.3 | 31.3 |
| 2X | 31.3 | 30.8 | 30.4 | 30.1 | 29.7 |
| 3X | 29.3 | 29.0 | 28.6 | 28.3 | 28.1 |
| 4X | 27.8 | 27.6 | 27.4 | 27.2 | 27.0 |
| 5X | 26.8 | 26.6 | 26.4 | 26.2 | 26.0 |
| 6X | 25.8 | 25.6 | 25.3 | 25.1 | 24.8 |
| 7X | 24.6 | 24.3 | 24.1 | 23.8 | 23.6 |
| 8X | 23.3 | 23.1 | 22.8 | 22.5 | 22.3 |
| 9X | 22.0 | 21.8 | 21.5 | 21.1 | 20.6 |
| 10X | 20.1 | | | | |

### Trails

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 29.6 | 25.5 | 24.8 | 24.3 | 24.0 |
| 1X | 23.6 | 23.2 | 22.7 | 22.3 | 21.9 |
| 2X | 21.6 | 21.3 | 21.0 | 20.7 | 20.4 |
| 3X | 20.1 | 19.9 | 19.6 | 19.4 | 19.2 |
| 4X | 19.0 | 18.8 | 18.6 | 18.5 | 18.3 |
| 5X | 18.2 | 18.0 | 17.8 | 17.7 | 17.5 |
| 6X | 17.4 | 17.2 | 17.1 | 17.0 | 16.9 |
| 7X | 16.8 | 16.7 | 16.6 | 16.5 | 16.4 |
| 8X | 16.2 | 16.1 | 16.0 | 15.9 | 15.8 |
| 9X | 15.7 | 15.5 | 15.3 | 14.8 | 14.3 |
| 10X | 13.8 | | | | |

### Off-Road

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 26.0 | 23.8 | 23.3 | 23.0 | 22.7 |
| 1X | 22.3 | 21.9 | 21.4 | 20.9 | 20.5 |
| 2X | 20.1 | 19.8 | 19.5 | 19.2 | 18.9 |
| 3X | 18.6 | 18.3 | 18.1 | 17.8 | 17.6 |
| 4X | 17.3 | 17.1 | 16.8 | 16.6 | 16.3 |
| 5X | 16.1 | 15.8 | 15.6 | 15.3 | 15.0 |
| 6X | 14.8 | 14.5 | 14.2 | 13.9 | 13.6 |
| 7X | 13.3 | 12.9 | 12.6 | 12.2 | 11.9 |
| 8X | 11.5 | 11.1 | 10.7 | 10.3 | 9.8 |
| 9X | 9.2 | 8.7 | 8.2 | 7.6 | 3.9 |
| 10X | 2.2 | | | | |

## Wet Normal Condition

### Primary Roads

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 32.0 | 32.0 | 32.0 | 32.0 | 32.0 |
| 1X | 32.0 | 32.0 | 32.0 | 32.0 | 32.0 |
| 2X | 32.0 | 32.0 | 32.0 | 32.0 | 32.0 |
| 3X | 32.0 | 32.0 | 32.0 | 32.0 | 32.0 |
| 4X | 32.0 | 32.0 | 31.9 | 31.7 | 31.4 |
| 5X | 31.1 | 30.8 | 30.5 | 30.3 | 30.0 |
| 6X | 29.7 | 29.5 | 29.3 | 29.0 | 28.8 |
| 7X | 28.6 | 28.4 | 28.3 | 28.1 | 28.0 |
| 8X | 27.7 | 27.4 | 27.2 | 26.8 | 26.4 |
| 9X | 26.0 | 25.5 | 25.2 | 24.8 | 24.1 |
| 10X | 23.5 | | | | |

### Secondary Roads

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 32.0 | 32.0 | 31.8 | 31.6 | 31.5 |
| 1X | 31.4 | 31.4 | 31.4 | 31.3 | 31.3 |
| 2X | 31.3 | 30.8 | 30.4 | 30.1 | 29.7 |
| 3X | 29.3 | 29.0 | 28.6 | 28.3 | 28.1 |
| 4X | 27.8 | 27.6 | 27.4 | 27.2 | 27.0 |
| 5X | 26.8 | 26.6 | 26.4 | 26.2 | 26.0 |
| 6X | 25.8 | 25.6 | 25.3 | 25.1 | 24.8 |
| 7X | 24.6 | 24.3 | 24.1 | 23.8 | 23.6 |
| 8X | 23.3 | 23.1 | 22.8 | 22.5 | 22.3 |
| 9X | 22.0 | 21.8 | 21.5 | 21.1 | 20.6 |
| 10X | 20.1 | | | | |

### Trails

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 20.4 | 19.4 | 18.8 | 18.6 | 18.3 |
| 1X | 18.0 | 17.8 | 17.7 | 17.5 | 17.4 |
| 2X | 17.2 | 17.1 | 16.9 | 16.8 | 16.7 |
| 3X | 16.6 | 16.5 | 16.3 | 16.2 | 16.1 |
| 4X | 16.0 | 15.9 | 15.8 | 15.7 | 15.6 |
| 5X | 15.5 | 15.4 | 15.3 | 15.2 | 15.1 |
| 6X | 15.1 | 15.0 | 14.9 | 14.8 | 14.7 |
| 7X | 14.7 | 14.6 | 14.5 | 14.4 | 14.3 |
| 8X | 14.3 | 14.2 | 14.1 | 14.1 | 14.0 |
| 9X | 13.9 | 13.8 | 13.6 | 13.3 | 12.9 |
| 10X | 12.5 | | | | |

### Off-Road

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 21.9 | 19.2 | 18.4 | 17.7 | 17.2 |
| 1X | 16.7 | 16.2 | 15.8 | 15.4 | 15.1 |
| 2X | 14.7 | 14.4 | 14.0 | 13.7 | 13.3 |
| 3X | 13.0 | 12.7 | 12.4 | 12.2 | 12.0 |
| 4X | 11.8 | 11.6 | 11.4 | 11.2 | 11.0 |
| 5X | 10.9 | 10.7 | 10.6 | 10.4 | 10.3 |
| 6X | 10.1 | 10.0 | 9.8 | 9.7 | 9.5 |
| 7X | 9.3 | 9.1 | 8.9 | 8.7 | 8.5 |
| 8X | 8.2 | 8.0 | 7.7 | 7.4 | 7.1 |
| 9X | 6.8 | 6.5 | 5.8 | 2.8 | 1.8 |
| 10X | 1.3 | | | | |

## Wet-Wet Slippery Condition

### Primary Roads

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 32.0 | 32.0 | 32.0 | 32.0 | 32.0 |
| 1X | 32.0 | 32.0 | 32.0 | 32.0 | 32.0 |
| 2X | 32.0 | 32.0 | 32.0 | 32.0 | 32.0 |
| 3X | 32.0 | 32.0 | 32.0 | 32.0 | 32.0 |
| 4X | 32.0 | 32.0 | 31.7 | 31.4 | 31.1 |
| 5X | 30.8 | 30.6 | 30.3 | 30.0 | 29.8 |
| 6X | 29.5 | 29.3 | 29.0 | 28.8 | 28.6 |
| 7X | 28.4 | 28.3 | 28.1 | 27.9 | 27.7 |
| 8X | 27.4 | 27.2 | 26.8 | 26.4 | 26.0 |
| 9X | 25.6 | 25.2 | 24.8 | 24.4 | 23.7 |
| 10X | 23.0 | | | | |

### Secondary Roads

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 32.0 | 32.0 | 31.7 | 31.6 | 31.5 |
| 1X | 31.4 | 31.4 | 31.4 | 31.3 | 31.3 |
| 2X | 31.1 | 30.7 | 30.3 | 29.9 | 29.5 |
| 3X | 29.2 | 28.8 | 28.5 | 28.2 | 28.0 |
| 4X | 27.7 | 27.5 | 27.3 | 27.1 | 26.9 |
| 5X | 26.7 | 26.5 | 26.2 | 26.0 | 25.8 |
| 6X | 25.6 | 25.3 | 25.1 | 24.8 | 24.6 |
| 7X | 24.3 | 24.1 | 23.8 | 23.6 | 23.3 |
| 8X | 23.1 | 22.8 | 22.5 | 22.2 | 22.0 |
| 9X | 21.8 | 21.5 | 21.2 | 20.8 | 20.5 |
| 10X | 19.8 | | | | |

### Trails

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 18.0 | 18.0 | 18.0 | 17.8 | 17.6 |
| 1X | 17.4 | 17.3 | 17.2 | 17.0 | 16.9 |
| 2X | 16.7 | 16.6 | 16.5 | 16.4 | 16.2 |
| 3X | 16.1 | 16.0 | 15.8 | 15.7 | 15.6 |
| 4X | 15.5 | 15.4 | 15.3 | 15.2 | 15.1 |
| 5X | 15.0 | 14.9 | 14.8 | 14.8 | 14.7 |
| 6X | 14.6 | 14.5 | 14.4 | 14.3 | 14.2 |
| 7X | 14.1 | 14.1 | 14.0 | 13.9 | 13.9 |
| 8X | 13.8 | 13.7 | 13.6 | 13.6 | 13.5 |
| 9X | 13.4 | 13.2 | 13.0 | 12.7 | 12.2 |
| 10X | 11.8 | | | | |

### Off-Road

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 20.5 | 17.7 | 16.6 | 16.0 | 15.4 |
| 1X | 14.9 | 14.5 | 14.2 | 13.8 | 13.4 |
| 2X | 13.0 | 12.7 | 12.4 | 12.1 | 11.8 |
| 3X | 11.6 | 11.4 | 11.2 | 11.0 | 10.9 |
| 4X | 10.7 | 10.5 | 10.4 | 10.3 | 10.1 |
| 5X | 10.0 | 9.9 | 9.7 | 9.6 | 9.5 |
| 6X | 9.4 | 9.3 | 9.1 | 9.0 | 8.8 |
| 7X | 8.6 | 8.5 | 8.3 | 8.1 | 7.8 |
| 8X | 7.6 | 7.4 | 7.1 | 6.8 | 6.5 |
| 9X | 6.1 | 3.8 | 2.1 | 1.5 | 1.2 |
| 10X | 1.0 | | | | |

## Snow Condition

### Primary Roads

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 32.0 | 32.0 | 32.0 | 32.0 | 32.0 |
| 1X | 32.0 | 32.0 | 32.0 | 32.0 | 32.0 |
| 2X | 32.0 | 32.0 | 32.0 | 32.0 | 32.0 |
| 3X | 32.0 | 32.0 | 32.0 | 32.0 | 32.0 |
| 4X | 31.9 | 31.6 | 31.3 | 30.9 | 30.6 |
| 5X | 30.3 | 30.0 | 29.7 | 29.5 | 29.2 |
| 6X | 28.9 | 28.7 | 28.5 | 28.3 | 28.1 |
| 7X | 27.9 | 27.7 | 27.4 | 27.1 | 26.8 |
| 8X | 26.4 | 26.0 | 25.5 | 25.1 | 24.8 |
| 9X | 24.4 | 24.0 | 23.5 | 22.9 | 22.1 |
| 10X | 21.0 | | | | |

### Secondary Roads

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 32.0 | 32.0 | 31.7 | 31.5 | 31.5 |
| 1X | 31.4 | 31.4 | 31.3 | 31.3 | 31.3 |
| 2X | 30.9 | 30.4 | 30.0 | 29.6 | 29.2 |
| 3X | 28.8 | 28.5 | 28.2 | 27.9 | 27.7 |
| 4X | 27.4 | 27.2 | 27.0 | 26.8 | 26.5 |
| 5X | 26.3 | 26.0 | 25.8 | 25.5 | 25.3 |
| 6X | 25.0 | 24.7 | 24.4 | 24.1 | 23.9 |
| 7X | 23.6 | 23.3 | 23.0 | 22.7 | 22.4 |
| 8X | 22.1 | 21.9 | 21.6 | 21.3 | 21.1 |
| 9X | 20.7 | 20.3 | 19.9 | 19.4 | 18.8 |
| 10X | 18.1 | | | | |

### Trails

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 6 |
|---|---|---|---|---|---|
| X | 30.0 | 26.9 | 25.4 | 24.6 | 24.2 |
| 1X | 23.8 | 23.2 | 22.7 | 22.2 | 21.8 |
| 2X | 21.5 | 21.1 | 20.8 | 20.4 | 20.1 |
| 3X | 19.8 | 19.6 | 19.3 | 19.1 | 18.9 |
| 4X | 18.7 | 18.5 | 18.4 | 18.2 | 18.0 |
| 5X | 17.8 | 17.7 | 17.5 | 17.4 | 17.2 |
| 6X | 17.1 | 17.0 | 16.8 | 16.7 | 16.6 |
| 7X | 16.5 | 16.4 | 16.2 | 16.1 | 16.0 |
| 8X | 15.9 | 15.7 | 15.6 | 15.5 | 15.3 |
| 9X | 15.1 | 15.0 | 14.6 | 14.0 | 13.3 |
| 10X | 12.6 | | | | |

### Off-Road

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 27.8 | 23.6 | 23.1 | 22.7 | 22.2 |
| 1X | 21.7 | 21.1 | 20.6 | 20.1 | 19.7 |
| 2X | 19.3 | 18.9 | 18.6 | 18.3 | 17.9 |
| 3X | 17.6 | 17.3 | 17.0 | 16.7 | 16.5 |
| 4X | 16.2 | 15.9 | 15.7 | 15.4 | 15.1 |
| 5X | 14.9 | 14.6 | 14.3 | 14.0 | 13.7 |
| 6X | 13.4 | 13.1 | 12.9 | 12.6 | 12.3 |
| 7X | 12.0 | 11.6 | 11.3 | 10.9 | 10.5 |
| 8X | 10.1 | 9.4 | 8.8 | 4.1 | 2.1 |
| 9X | 1.5 | 1.1 | 0.9 | 0.8 | 0.7 |
| 10X | 0.6 | | | | |

Table B6

Speed Profiles (mph) for Vehicle 6 in Schotten Quad (L5520) for Roads and Lauterbach Quad (L5322) for Off-Roads in the Federal Republic of Germany

## Dry Condition

### Primary Roads

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 50.0 | 50.0 | 50.0 | 50.0 | 50.0 |
| 1X | 50.0 | 50.0 | 50.0 | 50.0 | 50.0 |
| 2X | 50.0 | 50.0 | 50.0 | 50.0 | 50.0 |
| 3X | 50.0 | 50.0 | 50.0 | 50.0 | 50.0 |
| 4X | 49.9 | 49.5 | 49.0 | 48.4 | 47.8 |
| 5X | 47.3 | 46.8 | 46.2 | 45.6 | 44.9 |
| 6X | 44.3 | 43.7 | 43.2 | 42.7 | 42.3 |
| 7X | 41.8 | 41.4 | 40.9 | 40.3 | 39.6 |
| 8X | 38.8 | 37.9 | 37.1 | 36.2 | 35.1 |
| 9X | 34.1 | 33.2 | 32.4 | 31.5 | 30.3 |
| 10X | 29.1 | | | | |

### Secondary Roads

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 50.0 | 49.3 | 48.6 | 48.4 | 48.3 |
| 1X | 47.7 | 46.5 | 45.0 | 44.0 | 43.0 |
| 2X | 41.7 | 40.2 | 38.0 | 36.4 | 35.1 |
| 3X | 34.0 | 33.1 | 32.2 | 31.2 | 30.2 |
| 4X | 29.0 | 27.8 | 26.8 | 25.9 | 25.1 |
| 5X | 24.3 | 23.2 | 22.2 | 21.4 | 20.7 |
| 6X | 20.1 | 19.5 | 19.0 | 18.6 | 18.2 |
| 7X | 17.8 | 17.5 | 17.2 | 16.9 | 16.7 |
| 8X | 16.5 | 16.2 | 16.1 | 15.9 | 15.7 |
| 9X | 15.5 | 15.4 | 15.2 | 15.0 | 14.9 |
| 10X | 14.7 | | | | |

### Trails

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 8.7 | 8.7 | 8.7 | 8.7 | 8.7 |
| 1X | 8.7 | 8.6 | 8.5 | 8.5 | 8.4 |
| 2X | 8.4 | 8.4 | 8.4 | 8.4 | 8.3 |
| 3X | 8.3 | 8.3 | 8.2 | 8.2 | 8.2 |
| 4X | 8.1 | 8.1 | 8.0 | 8.0 | 8.0 |
| 5X | 7.9 | 7.9 | 7.9 | 7.8 | 7.8 |
| 6X | 7.8 | 7.8 | 7.8 | 7.7 | 7.7 |
| 7X | 7.7 | 7.7 | 7.7 | 7.7 | 7.6 |
| 8X | 7.6 | 7.6 | 7.6 | 7.6 | 7.6 |
| 9X | 7.6 | 7.5 | 7.5 | 7.5 | 7.4 |
| 10X | 7.3 | | | | |

### Off-Road

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 46.0 | 30.3 | 25.5 | 23.3 | 20.9 |
| 1X | 18.9 | 17.5 | 16.6 | 15.9 | 15.2 |
| 2X | 14.6 | 14.1 | 13.6 | 13.0 | 12.6 |
| 3X | 12.3 | 12.0 | 11.7 | 11.4 | 11.2 |
| 4X | 11.0 | 10.8 | 10.6 | 10.4 | 10.3 |
| 5X | 10.1 | 10.0 | 9.8 | 9.7 | 9.6 |
| 6X | 9.4 | 9.3 | 9.1 | 9.0 | 8.8 |
| 7X | 8.7 | 8.5 | 8.4 | 8.2 | 8.1 |
| 8X | 7.9 | 7.7 | 7.5 | 3.8 | 2.1 |
| 9X | 1.4 | 1.1 | 0.9 | 0.8 | 0.7 |
| 10X | 0.6 | | | | |

## Wet Normal Condition

### Primary Roads

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 50.0 | 50.0 | 50.0 | 50.0 | 50.0 |
| 1X | 50.0 | 50.0 | 50.0 | 50.0 | 50.0 |
| 2X | 50.0 | 50.0 | 50.0 | 50.0 | 50.0 |
| 3X | 50.0 | 50.0 | 50.0 | 50.0 | 50.0 |
| 4X | 49.9 | 49.5 | 49.0 | 48.4 | 47.8 |
| 5X | 47.3 | 46.8 | 46.2 | 45.6 | 44.9 |
| 6X | 44.3 | 43.7 | 43.2 | 42.7 | 42.3 |
| 7X | 41.8 | 41.4 | 40.9 | 40.3 | 39.6 |
| 8X | 38.8 | 37.9 | 37.1 | 36.2 | 35.1 |
| 9X | 34.1 | 33.2 | 32.4 | 31.5 | 30.3 |
| 10X | 29.1 | | | | |

### Secondary Roads

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 50.0 | 49.3 | 48.6 | 48.4 | 48.3 |
| 1X | 47.7 | 46.5 | 45.0 | 44.0 | 43.0 |
| 2X | 41.7 | 40.2 | 38.0 | 36.4 | 35.1 |
| 3X | 34.0 | 33.1 | 32.2 | 31.2 | 30.2 |
| 4X | 29.0 | 27.8 | 26.8 | 25.9 | 25.1 |
| 5X | 24.3 | 23.2 | 22.2 | 21.4 | 20.7 |
| 6X | 20.1 | 19.5 | 19.0 | 18.6 | 18.2 |
| 7X | 17.8 | 17.5 | 17.2 | 16.9 | 16.7 |
| 8X | 16.5 | 16.2 | 16.1 | 15.9 | 15.7 |
| 9X | 15.5 | 15.4 | 15.2 | 15.0 | 14.9 |
| 10X | 14.7 | | | | |

### Trails

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 8.7 | 8.7 | 8.7 | 8.7 | 8.6 |
| 1X | 8.5 | 8.5 | 8.4 | 8.4 | 8.4 |
| 2X | 8.3 | 8.3 | 8.2 | 8.2 | 8.2 |
| 3X | 8.1 | 8.1 | 8.1 | 8.0 | 8.0 |
| 4X | 7.9 | 7.9 | 7.9 | 7.8 | 7.8 |
| 5X | 7.8 | 7.8 | 7.7 | 7.7 | 7.7 |
| 6X | 7.7 | 7.7 | 7.6 | 7.6 | 7.6 |
| 7X | 7.6 | 7.6 | 7.6 | 7.5 | 7.5 |
| 8X | 7.5 | 7.5 | 7.5 | 7.5 | 7.5 |
| 9X | 7.4 | 7.4 | 7.4 | 7.3 | 7.2 |
| 10X | 3.5 | | | | |

### Off-Road

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 24.8 | 17.4 | 14.8 | 13.3 | 12.1 |
| 1X | 11.3 | 10.7 | 10.1 | 9.7 | 9.3 |
| 2X | 8.9 | 8.5 | 8.1 | 7.7 | 7.3 |
| 3X | 6.5 | 1.8 | 0.9 | 0.6 | 0.5 |
| 4X | 0.4 | 0.4 | 0.3 | 0.3 | 0.3 |
| 5X | 0.3 | 0.2 | 0.2 | 0.2 | 0.2 |
| 6X | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 |
| 7X | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 |
| 8X | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 |
| 9X | 0.2 | 0.1 | 0.1 | 0.1 | 0.1 |
| 10X | 0.1 | | | | |

## Wet-Wet Slippery Condition

### Primary Roads

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 50.0 | 50.0 | 50.0 | 50.0 | 50.0 |
| 1X | 50.0 | 50.0 | 50.0 | 50.0 | 50.0 |
| 2X | 50.0 | 50.0 | 50.0 | 50.0 | 50.0 |
| 3X | 50.0 | 50.0 | 50.0 | 50.0 | 50.0 |
| 4X | 49.9 | 49.5 | 48.9 | 48.2 | 47.7 |
| 5X | 47.2 | 46.5 | 45.9 | 45.2 | 44.5 |
| 6X | 43.9 | 43.4 | 42.9 | 42.4 | 42.0 |
| 7X | 41.6 | 41.0 | 40.4 | 39.7 | 38.8 |
| 8X | 37.9 | 37.1 | 36.3 | 35.2 | 34.2 |
| 9X | 33.3 | 32.4 | 31.6 | 30.7 | 29.5 |
| 10X | 28.2 | | | | |

### Secondary Roads

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 50.0 | 49.3 | 48.6 | 48.4 | 48.3 |
| 1X | 47.6 | 46.3 | 44.9 | 43.8 | 42.9 |
| 2X | 41.5 | 39.7 | 37.6 | 36.0 | 34.8 |
| 3X | 33.7 | 32.8 | 31.8 | 30.8 | 29.7 |
| 4X | 28.4 | 27.3 | 26.3 | 25.5 | 24.7 |
| 5X | 23.8 | 22.8 | 21.8 | 21.1 | 20.4 |
| 6X | 19.8 | 19.3 | 18.8 | 18.4 | 18.0 |
| 7X | 17.6 | 17.3 | 17.0 | 16.8 | 16.5 |
| 8X | 16.3 | 16.1 | 15.9 | 15.7 | 15.6 |
| 9X | 15.4 | 15.3 | 15.1 | 14.9 | 14.7 |
| 10X | 14.5 | | | | |

### Trails

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 8.7 | 8.7 | 8.7 | 8.7 | 8.5 |
| 1X | 8.5 | 8.4 | 8.4 | 8.3 | 8.2 |
| 2X | 8.2 | 8.1 | 8.1 | 8.1 | 8.0 |
| 3X | 8.0 | 7.9 | 7.9 | 7.9 | 7.8 |
| 4X | 7.8 | 7.8 | 7.7 | 7.7 | 7.7 |
| 5X | 7.7 | 7.6 | 7.6 | 7.6 | 7.6 |
| 6X | 7.6 | 7.6 | 7.5 | 7.5 | 7.5 |
| 7X | 7.5 | 7.5 | 7.5 | 7.5 | 7.5 |
| 8X | 7.4 | 7.4 | 7.4 | 7.4 | 7.4 |
| 9X | 7.3 | 7.3 | 7.3 | 7.2 | 7.1 |
| 10X | 3.4 | | | | |

### Off-Road

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 20.1 | 14.0 | 12.5 | 11.3 | 10.6 |
| 1X | 10.0 | 9.5 | 9.0 | 8.6 | 8.2 |
| 2X | 7.8 | 7.4 | 7.0 | 2.6 | 0.9 |
| 3X | 0.6 | 0.5 | 0.4 | 0.3 | 0.3 |
| 4X | 0.3 | 0.2 | 0.2 | 0.2 | 0.2 |
| 5X | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 |
| 6X | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 |
| 7X | 0.2 | 0.2 | 0.2 | 0.1 | 0.1 |
| 8X | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| 9X | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| 10X | 0.1 | | | | |

## Snow Condition

### Primary Roads

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 40.5 | 40.5 | 40.5 | 40.5 | 40.5 |
| 1X | 40.5 | 40.5 | 40.5 | 40.5 | 40.5 |
| 2X | 40.5 | 40.5 | 40.5 | 40.5 | 40.5 |
| 3X | 40.5 | 40.5 | 40.5 | 40.5 | 40.5 |
| 4X | 40.3 | 40.0 | 39.7 | 39.3 | 39.0 |
| 5X | 38.7 | 38.2 | 37.7 | 37.2 | 36.8 |
| 6X | 36.4 | 36.0 | 35.7 | 35.4 | 35.0 |
| 7X | 34.6 | 34.0 | 33.3 | 32.7 | 32.1 |
| 8X | 31.5 | 30.7 | 30.0 | 29.3 | 28.7 |
| 9X | 28.1 | 27.5 | 26.7 | 25.9 | 24.8 |
| 10X | 23.4 | | | | |

### Secondary Roads

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 37.1 | 37.1 | 37.1 | 37.1 | 37.1 |
| 1X | 37.0 | 36.4 | 35.7 | 35.2 | 34.6 |
| 2X | 33.8 | 32.2 | 30.9 | 29.8 | 29.0 |
| 3X | 28.2 | 27.6 | 26.9 | 25.9 | 25.0 |
| 4X | 24.2 | 23.5 | 22.9 | 22.2 | 21.5 |
| 5X | 20.7 | 20.0 | 19.4 | 18.8 | 18.3 |
| 6X | 17.9 | 17.5 | 17.2 | 16.9 | 16.6 |
| 7X | 16.3 | 16.1 | 15.9 | 15.7 | 15.5 |
| 8X | 15.3 | 15.2 | 15.0 | 14.9 | 14.7 |
| 9X | 14.6 | 14.5 | 14.3 | 14.1 | 13.9 |
| 10X | 13.5 | | | | |

### Trails

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 6.1 | 6.1 | 6.1 | 6.1 | 6.0 |
| 1X | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 |
| 2X | 6.0 | 5.9 | 5.9 | 5.9 | 5.9 |
| 3X | 5.9 | 5.9 | 5.9 | 5.9 | 5.9 |
| 4X | 5.9 | 5.9 | 5.9 | 5.9 | 5.9 |
| 5X | 5.9 | 5.9 | 5.9 | 5.9 | 5.8 |
| 6X | 5.8 | 5.8 | 5.8 | 5.8 | 5.8 |
| 7X | 5.8 | 5.8 | 5.8 | 5.8 | 5.8 |
| 8X | 5.7 | 5.7 | 5.7 | 5.7 | 5.7 |
| 9X | 5.6 | 5.5 | 5.5 | 5.4 | 5.3 |
| 10X | 5.1 | | | | |

### Off-Road

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 6.3 | 6.1 | 6.1 | 6.0 | 6.0 |
| 1X | 5.9 | 5.9 | 5.9 | 5.9 | 5.8 |
| 2X | 5.8 | 5.8 | 5.8 | 5.7 | 5.7 |
| 3X | 5.7 | 5.7 | 5.6 | 5.6 | 5.6 |
| 4X | 5.6 | 5.5 | 5.5 | 5.4 | 5.4 |
| 5X | 5.3 | 5.3 | 5.2 | 5.2 | 5.1 |
| 6X | 5.1 | 5.0 | 4.9 | 4.9 | 4.8 |
| 7X | 4.6 | 4.4 | 2.9 | 1.7 | 1.2 |
| 8X | 0.9 | 0.8 | 0.7 | 0.6 | 0.5 |
| 9X | 0.5 | 0.4 | 0.4 | 0.4 | 0.4 |
| 10X | 0.3 | | | | |

Table B7

Speed Profiles (mph) for Vehicle 1 in Mafraq Quad (3254) in Jordan

## Dry Condition

### Primary Roads

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 50.0 | 50.0 | 50.0 | 50.0 | 50.0 |
| 1X | 50.0 | 50.0 | 50.0 | 50.0 | 50.0 |
| 2X | 50.0 | 50.0 | 49.8 | 49.7 | 49.6 |
| 3X | 49.4 | 49.3 | 49.3 | 49.2 | 49.1 |
| 4X | 49.0 | 49.0 | 48.9 | 48.7 | 48.6 |
| 5X | 48.4 | 48.1 | 47.7 | 47.3 | 46.9 |
| 6X | 46.5 | 46.2 | 45.9 | 45.6 | 45.3 |
| 7X | 45.0 | 44.8 | 44.5 | 44.3 | 44.0 |
| 8X | 43.7 | 43.4 | 43.0 | 42.6 | 42.1 |
| 9X | 41.2 | 39.8 | 37.5 | 35.5 | 33.7 |
| 10X | 32.2 | | | | |

### Secondary Roads

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 50.0 | 50.0 | 49.3 | 48.8 | 48.6 |
| 1X | 48.5 | 48.4 | 48.3 | 48.3 | 48.2 |
| 2X | 48.2 | 47.9 | 47.6 | 46.2 | 44.7 |
| 3X | 42.9 | 40.5 | 36.9 | 34.2 | 32.0 |
| 4X | 30.3 | 28.9 | 27.7 | 26.7 | 25.9 |
| 5X | 25.2 | 24.2 | 23.1 | 22.2 | 21.4 |
| 6X | 20.7 | 20.1 | 19.6 | 19.1 | 18.7 |
| 7X | 18.3 | 17.9 | 17.6 | 17.3 | 17.0 |
| 8X | 16.8 | 16.6 | 16.3 | 16.1 | 16.0 |
| 9X | 15.8 | 15.6 | 15.5 | 15.3 | 15.2 |
| 10X | 15.1 | | | | |

### Trails

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 8.7 | 8.7 | 8.7 | 8.7 | 8.7 |
| 1X | 8.7 | 8.7 | 8.6 | 8.6 | 8.5 |
| 2X | 8.5 | 8.5 | 8.4 | 8.4 | 8.4 |
| 3X | 8.3 | 8.3 | 8.3 | 8.2 | 8.2 |
| 4X | 8.2 | 8.1 | 8.1 | 8.1 | 8.1 |
| 5X | 8.0 | 8.0 | 8.0 | 7.9 | 7.9 |
| 6X | 7.9 | 7.9 | 7.8 | 7.8 | 7.8 |
| 7X | 7.8 | 7.8 | 7.7 | 7.7 | 7.7 |
| 8X | 7.7 | 7.7 | 7.7 | 7.6 | 7.6 |
| 9X | 7.6 | 7.6 | 7.6 | 7.6 | 7.6 |
| 10X | 7.5 | | | | |

### Off-Road

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 27.8 | 9.3 | 9.1 | 9.1 | 9.1 |
| 1X | 9.1 | 9.0 | 9.0 | 9.0 | 8.9 |
| 2X | 8.9 | 8.8 | 8.8 | 8.7 | 8.7 |
| 3X | 8.6 | 8.6 | 8.5 | 8.5 | 8.4 |
| 4X | 8.4 | 8.3 | 8.3 | 8.3 | 8.2 |
| 5X | 8.2 | 8.2 | 8.1 | 8.1 | 8.1 |
| 6X | 8.0 | 8.0 | 8.0 | 7.9 | 7.9 |
| 7X | 7.9 | 7.8 | 7.8 | 7.7 | 7.7 |
| 8X | 7.6 | 7.5 | 7.5 | 7.4 | 7.2 |
| 9X | 2.8 | 1.8 | 1.3 | 1.0 | 0.9 |
| 10X | 0.8 | | | | |

## Wet-Wet Slippery Condition

### Primary Roads

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 50.0 | 50.0 | 50.0 | 50.0 | 50.0 |
| 1X | 50.0 | 50.0 | 50.0 | 50.0 | 50.0 |
| 2X | 50.0 | 50.0 | 49.8 | 49.7 | 49.5 |
| 3X | 49.4 | 49.3 | 49.2 | 49.2 | 49.1 |
| 4X | 49.0 | 49.0 | 48.8 | 48.7 | 48.5 |
| 5X | 48.4 | 48.0 | 47.5 | 47.1 | 46.7 |
| 6X | 46.3 | 46.0 | 45.7 | 45.4 | 45.1 |
| 7X | 44.9 | 44.6 | 44.3 | 44.1 | 43.6 |
| 8X | 43.2 | 42.8 | 42.3 | 41.8 | 41.2 |
| 9X | 40.1 | 38.5 | 36.1 | 33.9 | 32.1 |
| 10X | 30.5 | | | | |

### Secondary Roads

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 50.0 | 50.0 | 49.3 | 48.8 | 48.6 |
| 1X | 48.5 | 48.4 | 48.3 | 48.3 | 48.2 |
| 2X | 48.2 | 47.7 | 47.0 | 45.2 | 43.5 |
| 3X | 41.4 | 38.9 | 35.6 | 33.0 | 31.1 |
| 4X | 29.5 | 28.2 | 27.1 | 26.2 | 25.4 |
| 5X | 24.7 | 23.8 | 22.8 | 21.9 | 21.1 |
| 6X | 20.5 | 19.9 | 19.4 | 18.9 | 18.5 |
| 7X | 18.1 | 17.8 | 17.4 | 17.2 | 16.9 |
| 8X | 16.7 | 16.4 | 16.2 | 16.0 | 15.9 |
| 9X | 15.7 | 15.5 | 15.4 | 15.2 | 15.1 |
| 10X | 15.0 | | | | |

### Trails

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 8.7 | 8.7 | 8.7 | 8.7 | 8.5 |
| 1X | 8.5 | 8.4 | 8.4 | 8.4 | 8.3 |
| 2X | 8.3 | 8.3 | 8.2 | 8.2 | 8.1 |
| 3X | 8.1 | 8.1 | 8.1 | 8.0 | 8.0 |
| 4X | 8.0 | 8.0 | 7.9 | 7.9 | 7.9 |
| 5X | 7.8 | 7.8 | 7.8 | 7.8 | 7.7 |
| 6X | 7.7 | 7.7 | 7.7 | 7.7 | 7.7 |
| 7X | 7.6 | 7.6 | 7.6 | 7.6 | 7.6 |
| 8X | 7.6 | 7.6 | 7.5 | 7.5 | 7.5 |
| 9X | 7.5 | 7.4 | 7.4 | 7.4 | 7.3 |
| 10X | 7.3 | | | | |

### Off-Road

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 19.3 | 9.0 | 9.0 | 9.0 | 9.0 |
| 1X | 9.0 | 9.0 | 9.0 | 8.9 | 8.9 |
| 2X | 8.8 | 8.8 | 8.7 | 8.7 | 8.6 |
| 3X | 8.6 | 8.5 | 8.5 | 8.4 | 8.4 |
| 4X | 8.3 | 8.3 | 8.2 | 8.2 | 8.2 |
| 5X | 8.1 | 8.1 | 8.0 | 8.0 | 8.0 |
| 6X | 7.9 | 7.9 | 7.8 | 7.8 | 7.7 |
| 7X | 7.6 | 7.6 | 7.5 | 7.4 | 7.3 |
| 8X | 7.2 | 3.5 | 1.9 | 1.4 | 1.1 |
| 9X | 0.9 | 0.7 | 0.7 | 0.6 | 0.5 |
| 10X | 0.5 | | | | |

## Sand Condition

### Primary Roads

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 50.0 | 50.0 | 50.0 | 50.0 | 50.0 |
| 1X | 50.0 | 50.0 | 50.0 | 50.0 | 50.0 |
| 2X | 50.0 | 50.0 | 49.8 | 49.7 | 49.5 |
| 3X | 49.4 | 49.3 | 49.2 | 49.2 | 49.1 |
| 4X | 49.0 | 48.9 | 48.7 | 48.6 | 48.4 |
| 5X | 48.3 | 47.9 | 47.4 | 47.0 | 46.6 |
| 6X | 46.3 | 45.9 | 45.6 | 45.3 | 45.1 |
| 7X | 44.8 | 44.6 | 44.3 | 43.9 | 43.4 |
| 8X | 43.0 | 42.5 | 42.0 | 41.5 | 40.8 |
| 9X | 39.6 | 38.0 | 35.5 | 33.3 | 31.4 |
| 10X | 29.8 | | | | |

### Secondary Roads

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 50.0 | 50.0 | 49.3 | 48.8 | 48.6 |
| 1X | 48.5 | 48.4 | 48.3 | 48.3 | 48.2 |
| 2X | 48.2 | 47.7 | 47.0 | 45.2 | 43.5 |
| 3X | 41.4 | 38.9 | 35.6 | 33.0 | 31.1 |
| 4X | 29.5 | 28.2 | 27.1 | 26.2 | 25.4 |
| 5X | 24.7 | 23.8 | 22.8 | 21.9 | 21.1 |
| 6X | 20.5 | 19.9 | 19.4 | 18.9 | 18.5 |
| 7X | 18.1 | 17.8 | 17.4 | 17.2 | 16.9 |
| 8X | 16.7 | 16.4 | 16.2 | 16.0 | 15.9 |
| 9X | 15.7 | 15.5 | 15.4 | 15.2 | 15.1 |
| 10X | 15.0 | | | | |

### Trails

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 8.7 | 8.7 | 8.7 | 8.6 | 8.5 |
| 1X | 8.4 | 8.4 | 8.3 | 8.2 | 8.1 |
| 2X | 8.1 | 8.1 | 8.0 | 8.0 | 8.0 |
| 3X | 7.9 | 7.9 | 7.9 | 7.9 | 7.8 |
| 4X | 7.8 | 7.8 | 7.8 | 7.7 | 7.7 |
| 5X | 7.7 | 7.7 | 7.6 | 7.6 | 7.6 |
| 6X | 7.6 | 7.6 | 7.6 | 7.5 | 7.5 |
| 7X | 7.5 | 7.5 | 7.5 | 7.4 | 7.4 |
| 8X | 7.4 | 7.4 | 7.3 | 4.6 | 2.3 |
| 9X | 1.5 | 1.2 | 1.0 | 0.8 | 0.7 |
| 10X | 0.6 | | | | |

### Off-Road

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 12.5 | 9.0 | 9.0 | 9.0 | 9.0 |
| 1X | 9.0 | 9.0 | 8.9 | 8.8 | 8.7 |
| 2X | 8.7 | 8.6 | 8.5 | 8.4 | 8.4 |
| 3X | 8.3 | 8.3 | 8.2 | 8.2 | 8.1 |
| 4X | 8.1 | 8.1 | 8.0 | 8.0 | 7.9 |
| 5X | 7.9 | 7.9 | 7.8 | 7.8 | 7.7 |
| 6X | 7.7 | 7.6 | 7.5 | 7.4 | 7.3 |
| 7X | 7.2 | 7.0 | 3.7 | 1.9 | 1.3 |
| 8X | 1.0 | 0.8 | 0.7 | 0.6 | 0.6 |
| 9X | 0.5 | 0.5 | 0.4 | 0.4 | 0.4 |
| 10X | 0.4 | | | | |

Table B8

Speed Profiles (mph) for Vehicle 2 in Mafraq Quad (3254) in Jordan

## Dry Condition

### Primary Roads

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 55.0 | 55.0 | 55.0 | 55.0 | 55.0 |
| 1X | 55.0 | 55.0 | 55.0 | 55.0 | 55.0 |
| 2X | 55.0 | 55.0 | 54.7 | 54.4 | 54.1 |
| 3X | 53.9 | 53.7 | 53.5 | 53.4 | 53.2 |
| 4X | 53.1 | 53.0 | 52.7 | 52.3 | 52.0 |
| 5X | 51.6 | 51.2 | 50.8 | 50.4 | 50.0 |
| 6X | 49.7 | 49.4 | 49.1 | 48.8 | 48.5 |
| 7X | 48.2 | 47.9 | 47.6 | 47.3 | 46.9 |
| 8X | 46.5 | 46.1 | 45.7 | 45.1 | 44.5 |
| 9X | 43.4 | 41.8 | 39.3 | 37.0 | 35.1 |
| 10X | 33.4 | | | | |

### Secondary Roads

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 55.0 | 55.0 | 53.7 | 52.7 | 52.2 |
| 1X | 52.0 | 51.8 | 51.7 | 51.6 | 51.5 |
| 2X | 51.4 | 51.0 | 50.3 | 48.5 | 46.7 |
| 3X | 44.6 | 42.0 | 38.0 | 35.0 | 32.7 |
| 4X | 30.9 | 29.4 | 28.2 | 27.2 | 26.3 |
| 5X | 25.5 | 24.8 | 24.1 | 23.5 | 23.0 |
| 6X | 22.5 | 22.1 | 21.7 | 21.3 | 21.0 |
| 7X | 20.7 | 20.5 | 20.2 | 20.0 | 19.8 |
| 8X | 19.6 | 19.4 | 19.2 | 19.1 | 18.9 |
| 9X | 18.8 | 18.6 | 18.5 | 18.4 | 18.3 |
| 10X | 18.1 | | | | |

### Trails

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 10.6 | 10.6 | 10.6 | 10.6 | 10.6 |
| 1X | 10.6 | 10.4 | 10.2 | 10.1 | 9.9 |
| 2X | 9.9 | 9.8 | 9.7 | 9.7 | 9.6 |
| 3X | 9.5 | 9.4 | 9.3 | 9.2 | 9.1 |
| 4X | 9.1 | 9.0 | 8.9 | 8.9 | 8.9 |
| 5X | 8.8 | 8.8 | 8.8 | 8.7 | 8.7 |
| 6X | 8.7 | 8.7 | 8.6 | 8.6 | 8.6 |
| 7X | 8.6 | 8.6 | 8.5 | 8.5 | 8.5 |
| 8X | 8.5 | 8.5 | 8.5 | 8.4 | 8.4 |
| 9X | 8.4 | 8.4 | 8.4 | 8.3 | 8.3 |
| 10X | 8.2 | | | | |

### Off-Road

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 28.5 | 12.6 | 12.5 | 12.4 | 12.4 |
| 1X | 12.4 | 12.4 | 12.2 | 12.0 | 11.8 |
| 2X | 11.5 | 11.3 | 11.0 | 10.8 | 10.6 |
| 3X | 10.4 | 10.3 | 10.1 | 10.0 | 9.9 |
| 4X | 9.7 | 9.6 | 9.6 | 9.5 | 9.4 |
| 5X | 9.3 | 9.3 | 9.2 | 9.2 | 9.1 |
| 6X | 9.1 | 9.0 | 9.0 | 8.9 | 8.9 |
| 7X | 8.8 | 8.8 | 8.7 | 8.7 | 8.6 |
| 8X | 8.5 | 8.4 | 8.3 | 8.2 | 8.0 |
| 9X | 6.3 | 2.7 | 1.7 | 1.3 | 1.0 |
| 10X | 0.9 | | | | |

## Wet-Wet Slippery Condition

### Primary Roads

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 55.0 | 55.0 | 55.0 | 55.0 | 55.0 |
| 1X | 55.0 | 55.0 | 55.0 | 55.0 | 55.0 |
| 2X | 55.0 | 55.0 | 54.6 | 54.3 | 54.0 |
| 3X | 53.8 | 53.6 | 53.5 | 53.3 | 53.2 |
| 4X | 53.1 | 52.8 | 52.4 | 52.1 | 51.7 |
| 5X | 51.4 | 51.0 | 50.6 | 50.2 | 49.9 |
| 6X | 49.5 | 49.2 | 49.0 | 48.7 | 48.3 |
| 7X | 48.0 | 47.7 | 47.3 | 46.9 | 46.4 |
| 8X | 45.9 | 45.4 | 44.8 | 44.2 | 43.4 |
| 9X | 42.2 | 40.4 | 37.7 | 35.3 | 33.3 |
| 10X | 31.5 | | | | |

### Secondary Roads

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 50.7 | 50.7 | 50.0 | 49.4 | 49.2 |
| 1X | 49.0 | 48.9 | 48.8 | 48.8 | 48.7 |
| 2X | 48.7 | 48.2 | 47.4 | 45.6 | 43.7 |
| 3X | 41.6 | 39.1 | 35.7 | 33.2 | 31.2 |
| 4X | 29.6 | 28.3 | 27.2 | 26.3 | 25.5 |
| 5X | 24.8 | 24.1 | 23.5 | 22.9 | 22.5 |
| 6X | 22.0 | 21.6 | 21.3 | 21.0 | 20.7 |
| 7X | 20.4 | 20.1 | 19.9 | 19.7 | 19.5 |
| 8X | 19.3 | 19.1 | 19.0 | 18.8 | 18.7 |
| 9X | 18.5 | 18.4 | 18.3 | 18.2 | 18.1 |
| 10X | 17.8 | | | | |

### Trails

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 10.6 | 10.6 | 10.6 | 10.5 | 10.3 |
| 1X | 10.1 | 9.9 | 9.8 | 9.7 | 9.6 |
| 2X | 9.6 | 9.5 | 9.5 | 9.4 | 9.3 |
| 3X | 9.2 | 9.1 | 9.1 | 9.0 | 8.9 |
| 4X | 8.9 | 8.8 | 8.8 | 8.8 | 8.7 |
| 5X | 8.7 | 8.7 | 8.6 | 8.6 | 8.6 |
| 6X | 8.6 | 8.5 | 8.5 | 8.5 | 8.5 |
| 7X | 8.5 | 8.5 | 8.4 | 8.4 | 8.4 |
| 8X | 8.4 | 8.4 | 8.3 | 8.3 | 8.3 |
| 9X | 8.2 | 8.2 | 8.2 | 8.1 | 8.1 |
| 10X | 7.9 | | | | |

### Off-Road

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 19.8 | 12.3 | 12.3 | 12.3 | 12.3 |
| 1X | 12.3 | 12.2 | 12.0 | 11.8 | 11.6 |
| 2X | 11.3 | 11.0 | 10.8 | 10.6 | 10.4 |
| 3X | 10.3 | 10.1 | 10.0 | 9.8 | 9.7 |
| 4X | 9.6 | 9.5 | 9.4 | 9.4 | 9.3 |
| 5X | 9.2 | 9.2 | 9.1 | 9.1 | 9.0 |
| 6X | 8.9 | 8.9 | 8.8 | 8.8 | 8.7 |
| 7X | 8.6 | 8.5 | 8.5 | 8.4 | 8.3 |
| 8X | 8.2 | 8.1 | 7.9 | 7.7 | 6.3 |
| 9X | 2.7 | 1.7 | 1.3 | 1.0 | 0.9 |
| 10X | 0.7 | | | | |

## Sand Condition

### Primary Roads

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 55.0 | 55.0 | 55.0 | 55.0 | 55.0 |
| 1X | 55.0 | 55.0 | 55.0 | 55.0 | 55.0 |
| 2X | 55.0 | 55.0 | 54.6 | 54.3 | 54.0 |
| 3X | 53.8 | 53.6 | 53.5 | 53.3 | 53.2 |
| 4X | 53.1 | 52.7 | 52.3 | 52.0 | 51.6 |
| 5X | 51.3 | 50.9 | 50.5 | 50.1 | 49.8 |
| 6X | 49.5 | 49.2 | 48.9 | 48.6 | 48.3 |
| 7X | 47.9 | 47.6 | 47.2 | 46.7 | 46.2 |
| 8X | 45.6 | 45.1 | 44.4 | 43.8 | 42.9 |
| 9X | 41.6 | 39.8 | 37.0 | 34.6 | 32.6 |
| 10X | 30.8 | | | | |

### Secondary Roads

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 50.7 | 50.7 | 50.0 | 49.4 | 49.2 |
| 1X | 49.0 | 48.9 | 48.8 | 48.8 | 48.7 |
| 2X | 48.7 | 48.2 | 47.4 | 45.6 | 43.7 |
| 3X | 41.6 | 39.1 | 35.7 | 33.2 | 31.2 |
| 4X | 29.6 | 28.3 | 27.2 | 26.3 | 25.5 |
| 5X | 24.8 | 24.1 | 23.5 | 22.9 | 22.5 |
| 6X | 22.0 | 21.6 | 21.3 | 21.0 | 20.7 |
| 7X | 20.4 | 20.1 | 19.9 | 19.7 | 19.5 |
| 8X | 19.3 | 19.1 | 19.0 | 18.8 | 18.7 |
| 9X | 18.5 | 18.4 | 18.3 | 18.2 | 18.1 |
| 10X | 17.8 | | | | |

### Trails

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 10.6 | 10.6 | 10.3 | 10.0 | 9.7 |
| 1X | 9.6 | 9.5 | 9.4 | 9.3 | 9.1 |
| 2X | 9.0 | 9.0 | 8.9 | 8.8 | 8.7 |
| 3X | 8.7 | 8.6 | 8.6 | 8.6 | 8.5 |
| 4X | 8.5 | 8.5 | 8.5 | 8.4 | 8.4 |
| 5X | 8.4 | 8.4 | 8.4 | 8.3 | 8.3 |
| 6X | 8.3 | 8.3 | 8.3 | 8.2 | 8.2 |
| 7X | 8.2 | 8.2 | 8.2 | 8.1 | 8.1 |
| 8X | 8.1 | 8.0 | 8.0 | 7.9 | 5.2 |
| 9X | 2.4 | 1.6 | 1.2 | 1.0 | 0.8 |
| 10X | 0.7 | | | | |

### Off-Road

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 13.7 | 11.4 | 10.9 | 10.5 | 10.3 |
| 1X | 10.2 | 10.2 | 10.1 | 10.0 | 9.8 |
| 2X | 9.7 | 9.5 | 9.4 | 9.3 | 9.2 |
| 3X | 9.1 | 9.0 | 9.0 | 8.9 | 8.8 |
| 4X | 8.8 | 8.7 | 8.7 | 8.6 | 8.6 |
| 5X | 8.5 | 8.5 | 8.4 | 8.4 | 8.3 |
| 6X | 8.3 | 8.2 | 8.2 | 8.1 | 8.0 |
| 7X | 7.9 | 7.8 | 7.7 | 7.6 | 7.4 |
| 8X | 7.2 | 4.9 | 2.3 | 1.5 | 1.1 |
| 9X | 0.9 | 0.8 | 0.7 | 0.6 | 0.6 |
| 10X | 0.5 | | | | |

Table B9

Speed Profiles (mph) for Vehicle 3 in Mafraq Quad (3254) in Jordan

## Dry Condition

### Primary Roads

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 49.3 | 49.3 | 49.3 | 49.3 | 49.3 |
| 1X | 48.1 | 47.3 | 46.8 | 46.4 | 46.1 |
| 2X | 45.9 | 45.7 | 45.6 | 45.4 | 45.3 |
| 3X | 45.2 | 45.1 | 45.1 | 45.0 | 44.9 |
| 4X | 44.9 | 44.8 | 44.8 | 44.7 | 44.7 |
| 5X | 44.7 | 44.6 | 44.5 | 44.5 | 44.4 |
| 6X | 44.3 | 44.1 | 44.0 | 43.9 | 43.8 |
| 7X | 43.6 | 43.4 | 43.2 | 43.1 | 42.8 |
| 8X | 42.6 | 42.4 | 42.1 | 41.8 | 41.3 |
| 9X | 40.4 | 39.1 | 36.9 | 35.0 | 33.3 |
| 10X | 31.8 | | | | |

### Secondary Roads

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 43.9 | 43.9 | 43.9 | 43.9 | 43.9 |
| 1X | 43.9 | 43.9 | 43.9 | 43.9 | 43.9 |
| 2X | 43.9 | 43.9 | 43.9 | 42.9 | 41.9 |
| 3X | 40.5 | 38.9 | 37.7 | 36.6 | 35.7 |
| 4X | 34.9 | 34.3 | 33.7 | 33.2 | 32.7 |
| 5X | 32.3 | 31.9 | 31.6 | 31.3 | 31.0 |
| 6X | 30.7 | 30.5 | 30.3 | 30.1 | 29.9 |
| 7X | 29.6 | 29.4 | 29.2 | 29.1 | 28.8 |
| 8X | 28.5 | 27.9 | 27.3 | 26.8 | 26.3 |
| 9X | 25.9 | 25.5 | 25.1 | 24.8 | 24.4 |
| 10X | 23.9 | | | | |

### Trails

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 20.5 | 20.5 | 20.5 | 20.4 | 20.1 |
| 1X | 19.7 | 19.2 | 18.8 | 18.5 | 18.3 |
| 2X | 18.1 | 18.0 | 17.8 | 17.7 | 17.3 |
| 3X | 16.8 | 16.4 | 16.1 | 15.8 | 15.5 |
| 4X | 15.3 | 15.1 | 14.9 | 14.8 | 14.6 |
| 5X | 14.4 | 14.1 | 13.7 | 13.3 | 12.9 |
| 6X | 12.6 | 12.3 | 12.1 | 11.9 | 11.7 |
| 7X | 11.5 | 11.3 | 11.2 | 11.0 | 10.9 |
| 8X | 10.8 | 10.7 | 10.6 | 10.4 | 10.2 |
| 9X | 10.1 | 10.0 | 9.8 | 9.7 | 9.6 |
| 10X | 9.5 | | | | |

### Off-Road

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 28.9 | 22.3 | 22.3 | 22.3 | 22.3 |
| 1X | 22.3 | 22.0 | 21.4 | 20.9 | 20.4 |
| 2X | 19.9 | 19.5 | 19.1 | 18.7 | 18.3 |
| 3X | 17.9 | 17.6 | 17.3 | 16.9 | 16.5 |
| 4X | 16.2 | 15.8 | 15.5 | 15.3 | 15.0 |
| 5X | 14.8 | 14.6 | 14.3 | 14.1 | 13.9 |
| 6X | 13.7 | 13.4 | 13.1 | 12.8 | 12.5 |
| 7X | 12.2 | 12.0 | 11.7 | 11.4 | 11.2 |
| 8X | 10.9 | 10.7 | 10.5 | 10.3 | 10.0 |
| 9X | 9.8 | 9.5 | 9.1 | 8.8 | 8.4 |
| 10X | 3.2 | | | | |

## Wet-Wet Slippery Condition

### Primary Roads

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 49.3 | 49.3 | 49.3 | 49.3 | 49.3 |
| 1X | 48.1 | 47.3 | 46.8 | 46.4 | 46.1 |
| 2X | 45.9 | 45.7 | 45.6 | 45.4 | 45.3 |
| 3X | 45.2 | 45.1 | 45.1 | 45.0 | 44.9 |
| 4X | 44.9 | 44.8 | 44.8 | 44.7 | 44.7 |
| 5X | 44.7 | 44.6 | 44.5 | 44.5 | 44.4 |
| 6X | 44.3 | 44.1 | 44.0 | 43.8 | 43.6 |
| 7X | 43.4 | 43.2 | 43.0 | 42.8 | 42.5 |
| 8X | 42.2 | 41.8 | 41.4 | 41.0 | 40.4 |
| 9X | 39.4 | 37.9 | 35.5 | 33.4 | 31.7 |
| 10X | 30.1 | | | | |

### Secondary Roads

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 43.9 | 43.9 | 43.9 | 43.9 | 43.9 |
| 1X | 43.9 | 43.9 | 43.9 | 43.9 | 43.9 |
| 2X | 43.9 | 43.7 | 43.4 | 42.2 | 40.8 |
| 3X | 39.3 | 37.9 | 36.8 | 35.8 | 35.0 |
| 4X | 34.3 | 33.7 | 33.1 | 32.7 | 32.2 |
| 5X | 31.9 | 31.5 | 31.2 | 30.9 | 30.7 |
| 6X | 30.4 | 30.2 | 30.0 | 29.8 | 29.5 |
| 7X | 29.3 | 29.1 | 28.9 | 28.7 | 28.4 |
| 8X | 27.9 | 27.4 | 26.8 | 26.4 | 25.9 |
| 9X | 25.5 | 25.1 | 24.8 | 24.4 | 24.1 |
| 10X | 23.6 | | | | |

### Trails

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 20.3 | 20.3 | 19.6 | 18.7 | 18.2 |
| 1X | 17.9 | 17.7 | 17.4 | 17.2 | 17.1 |
| 2X | 16.9 | 16.8 | 16.6 | 16.3 | 15.9 |
| 3X | 15.6 | 15.3 | 15.1 | 14.9 | 14.7 |
| 4X | 14.5 | 14.4 | 14.2 | 13.9 | 13.7 |
| 5X | 13.4 | 13.1 | 12.7 | 12.4 | 12.1 |
| 6X | 11.9 | 11.7 | 11.5 | 11.3 | 11.1 |
| 7X | 11.0 | 10.8 | 10.7 | 10.6 | 10.5 |
| 8X | 10.4 | 10.3 | 10.1 | 10.0 | 9.9 |
| 9X | 9.7 | 9.6 | 9.5 | 9.4 | 9.3 |
| 10X | 9.1 | | | | |

### Off-Road

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 26.2 | 22.2 | 22.2 | 22.2 | 22.2 |
| 1X | 22.1 | 21.6 | 20.9 | 20.2 | 19.7 |
| 2X | 19.1 | 18.5 | 18.1 | 17.7 | 17.2 |
| 3X | 16.8 | 16.4 | 16.1 | 15.7 | 15.4 |
| 4X | 15.1 | 14.8 | 14.6 | 14.4 | 14.2 |
| 5X | 13.9 | 13.7 | 13.5 | 13.3 | 13.0 |
| 6X | 12.7 | 12.5 | 12.2 | 12.0 | 11.7 |
| 7X | 11.4 | 11.2 | 10.9 | 10.7 | 10.4 |
| 8X | 10.2 | 10.0 | 9.7 | 9.5 | 9.2 |
| 9X | 8.9 | 8.6 | 8.3 | 5.6 | 2.6 |
| 10X | 1.8 | | | | |

## Sand Condition

### Primary Roads

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 49.3 | 49.3 | 49.3 | 49.3 | 49.3 |
| 1X | 48.1 | 47.3 | 46.8 | 46.4 | 46.1 |
| 2X | 45.9 | 45.7 | 45.6 | 45.4 | 45.3 |
| 3X | 45.2 | 45.1 | 45.1 | 45.0 | 44.9 |
| 4X | 44.9 | 44.8 | 44.8 | 44.7 | 44.7 |
| 5X | 44.7 | 44.6 | 44.5 | 44.5 | 44.4 |
| 6X | 44.3 | 44.1 | 44.0 | 43.8 | 43.6 |
| 7X | 43.4 | 43.2 | 43.8 | 42.7 | 42.4 |
| 8X | 42.0 | 41.6 | 41.2 | 40.7 | 40.0 |
| 9X | 38.9 | 37.4 | 35.0 | 32.8 | 31.0 |
| 10X | 29.5 | | | | |

### Secondary Roads

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 43.9 | 43.9 | 43.9 | 43.9 | 43.9 |
| 1X | 43.9 | 43.9 | 43.9 | 43.9 | 43.9 |
| 2X | 43.9 | 43.7 | 43.4 | 42.2 | 40.8 |
| 3X | 39.3 | 37.9 | 36.8 | 35.8 | 35.0 |
| 4X | 34.3 | 33.7 | 33.1 | 32.7 | 32.2 |
| 5X | 31.9 | 31.5 | 31.2 | 30.9 | 30.7 |
| 6X | 30.4 | 30.2 | 30.0 | 29.8 | 29.5 |
| 7X | 29.3 | 29.1 | 28.9 | 28.7 | 28.4 |
| 8X | 27.9 | 27.4 | 26.8 | 26.4 | 25.9 |
| 9X | 25.5 | 25.1 | 24.8 | 24.4 | 24.1 |
| 10X | 23.6 | | | | |

### Trails

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 19.0 | 19.0 | 17.8 | 17.4 | 17.1 |
| 1X | 16.8 | 16.5 | 16.1 | 15.8 | 15.5 |
| 2X | 15.2 | 14.9 | 14.6 | 14.3 | 14.2 |
| 3X | 14.0 | 13.8 | 13.7 | 13.5 | 13.4 |
| 4X | 13.2 | 13.0 | 12.8 | 12.4 | 12.1 |
| 5X | 11.8 | 11.5 | 11.3 | 11.1 | 10.9 |
| 6X | 10.8 | 10.6 | 10.5 | 10.4 | 10.2 |
| 7X | 10.1 | 10.0 | 9.9 | 9.7 | 9.6 |
| 8X | 9.5 | 9.4 | 9.3 | 9.2 | 5.7 |
| 9X | 2.5 | 1.7 | 1.2 | 1.0 | 0.8 |
| 10X | 0.7 | | | | |

### Off-Road

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 21.7 | 17.6 | 16.1 | 15.4 | 15.0 |
| 1X | 14.7 | 14.4 | 14.1 | 13.8 | 13.6 |
| 2X | 13.5 | 13.4 | 13.3 | 13.1 | 12.9 |
| 3X | 12.8 | 12.7 | 12.5 | 12.4 | 12.3 |
| 4X | 12.2 | 12.1 | 12.0 | 11.9 | 11.7 |
| 5X | 11.6 | 11.4 | 11.3 | 11.1 | 10.9 |
| 6X | 10.7 | 10.6 | 10.4 | 10.2 | 10.0 |
| 7X | 9.8 | 9.6 | 9.4 | 9.2 | 9.0 |
| 8X | 8.8 | 8.6 | 8.3 | 8.0 | 7.7 |
| 9X | 3.3 | 1.9 | 1.4 | 1.1 | 0.9 |
| 10X | 0.8 | | | | |

Table B10

Speed Profiles (mph) for Vehicle 4 in Mafraq Quad (3254) in Jordan

## Dry Condition

### Primary Roads

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 50.0 | 50.0 | 50.0 | 50.0 | 50.0 |
| 1X | 50.0 | 50.0 | 50.0 | 50.0 | 50.0 |
| 2X | 50.0 | 50.0 | 50.0 | 50.0 | 50.0 |
| 3X | 50.0 | 50.0 | 50.0 | 50.0 | 50.0 |
| 4X | 50.0 | 50.0 | 50.0 | 50.0 | 50.0 |
| 5X | 50.0 | 49.9 | 49.9 | 49.8 | 49.7 |
| 6X | 49.7 | 49.6 | 49.5 | 49.5 | 49.4 |
| 7X | 49.2 | 49.1 | 49.0 | 48.7 | 48.4 |
| 8X | 48.2 | 47.8 | 47.3 | 46.8 | 46.1 |
| 9X | 44.9 | 43.2 | 40.5 | 38.0 | 36.0 |
| 10X | 34.2 | | | | |

### Secondary Roads

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 50.0 | 50.0 | 50.0 | 50.0 | 50.0 |
| 1X | 50.0 | 50.0 | 50.0 | 50.0 | 50.0 |
| 2X | 50.0 | 49.7 | 49.2 | 47.6 | 45.9 |
| 3X | 43.9 | 41.4 | 37.6 | 34.7 | 32.5 |
| 4X | 30.7 | 29.2 | 28.0 | 27.0 | 26.1 |
| 5X | 25.4 | 24.7 | 24.0 | 23.4 | 22.9 |
| 6X | 22.4 | 22.0 | 21.6 | 21.3 | 21.0 |
| 7X | 20.7 | 20.4 | 20.2 | 19.9 | 19.7 |
| 8X | 19.5 | 19.4 | 19.2 | 19.0 | 18.9 |
| 9X | 18.7 | 18.6 | 18.5 | 18.4 | 18.2 |
| 10X | 18.0 | | | | |

### Trails

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 10.6 | 10.6 | 10.6 | 10.6 | 10.6 |
| 1X | 10.6 | 10.6 | 10.5 | 10.3 | 10.1 |
| 2X | 10.0 | 9.9 | 9.8 | 9.8 | 9.7 |
| 3X | 9.7 | 9.6 | 9.4 | 9.4 | 9.3 |
| 4X | 9.2 | 9.1 | 9.1 | 9.0 | 9.0 |
| 5X | 8.9 | 8.9 | 8.9 | 8.8 | 8.8 |
| 6X | 8.8 | 8.7 | 8.7 | 8.7 | 8.7 |
| 7X | 8.6 | 8.6 | 8.6 | 8.6 | 8.6 |
| 8X | 8.6 | 8.5 | 8.5 | 8.5 | 8.5 |
| 9X | 8.5 | 8.5 | 8.4 | 8.4 | 8.4 |
| 10X | 8.3 | | | | |

### Off-Road

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 29.7 | 12.5 | 12.4 | 12.4 | 12.4 |
| 1X | 12.3 | 12.3 | 12.3 | 12.0 | 11.9 |
| 2X | 11.6 | 11.4 | 11.2 | 11.0 | 10.8 |
| 3X | 10.6 | 10.4 | 10.3 | 10.1 | 10.0 |
| 4X | 9.9 | 9.8 | 9.7 | 9.6 | 9.5 |
| 5X | 9.4 | 9.4 | 9.3 | 9.3 | 9.2 |
| 6X | 9.2 | 9.1 | 9.1 | 9.0 | 9.0 |
| 7X | 8.9 | 8.9 | 8.9 | 8.8 | 8.8 |
| 8X | 8.7 | 8.6 | 8.6 | 8.5 | 8.4 |
| 9X | 8.2 | 8.0 | 7.8 | 5.8 | 2.2 |
| 10X | 1.5 | | | | |

## Wet-Wet Slippery Condition

### Primary Roads

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 50.0 | 50.0 | 50.0 | 50.0 | 50.0 |
| 1X | 50.0 | 50.0 | 50.0 | 50.0 | 50.0 |
| 2X | 50.0 | 50.0 | 50.0 | 50.0 | 50.0 |
| 3X | 50.0 | 50.0 | 50.0 | 50.0 | 50.0 |
| 4X | 50.0 | 50.0 | 50.0 | 50.0 | 50.0 |
| 5X | 50.0 | 49.9 | 49.8 | 49.7 | 49.7 |
| 6X | 49.6 | 49.6 | 49.5 | 49.4 | 49.3 |
| 7X | 49.2 | 49.1 | 48.8 | 48.4 | 47.9 |
| 8X | 47.5 | 46.9 | 46.3 | 45.7 | 44.9 |
| 9X | 43.5 | 41.6 | 38.7 | 36.2 | 34.0 |
| 10X | 32.2 | | | | |

### Secondary Roads

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 50.0 | 50.0 | 50.0 | 50.0 | 50.0 |
| 1X | 50.0 | 50.0 | 50.0 | 50.0 | 50.0 |
| 2X | 50.0 | 49.4 | 48.6 | 46.6 | 44.6 |
| 3X | 42.3 | 39.7 | 36.2 | 33.5 | 31.5 |
| 4X | 29.9 | 28.5 | 27.4 | 26.4 | 25.6 |
| 5X | 24.9 | 24.2 | 23.6 | 23.1 | 22.6 |
| 6X | 22.1 | 21.7 | 21.4 | 21.0 | 20.7 |
| 7X | 20.5 | 20.2 | 20.0 | 19.8 | 19.6 |
| 8X | 19.4 | 19.2 | 19.0 | 18.9 | 18.7 |
| 9X | 18.6 | 18.5 | 18.3 | 18.2 | 18.1 |
| 10X | 17.9 | | | | |

### Trails

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 10.6 | 10.6 | 10.6 | 10.6 | 10.6 |
| 1X | 10.6 | 10.6 | 10.3 | 10.2 | 10.0 |
| 2X | 9.9 | 9.8 | 9.8 | 9.7 | 9.7 |
| 3X | 9.5 | 9.4 | 9.3 | 9.2 | 9.2 |
| 4X | 9.1 | 9.0 | 9.0 | 8.9 | 8.9 |
| 5X | 8.9 | 8.8 | 8.8 | 8.8 | 8.7 |
| 6X | 8.7 | 8.7 | 8.7 | 8.6 | 8.6 |
| 7X | 8.6 | 8.6 | 8.6 | 8.5 | 8.5 |
| 8X | 8.5 | 8.5 | 8.5 | 8.5 | 8.5 |
| 9X | 8.4 | 8.4 | 8.4 | 8.4 | 8.4 |
| 10X | 8.2 | | | | |

### Off-Road

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 19.2 | 12.3 | 12.3 | 12.3 | 12.3 |
| 1X | 12.3 | 12.3 | 12.0 | 11.8 | 11.7 |
| 2X | 11.4 | 11.2 | 11.0 | 10.8 | 10.6 |
| 3X | 10.4 | 10.3 | 10.1 | 10.0 | 9.9 |
| 4X | 9.7 | 9.6 | 9.6 | 9.5 | 9.4 |
| 5X | 9.3 | 9.3 | 9.2 | 9.2 | 9.1 |
| 6X | 9.1 | 9.0 | 9.0 | 9.0 | 8.9 |
| 7X | 8.9 | 8.8 | 8.8 | 8.7 | 8.7 |
| 8X | 8.6 | 8.5 | 8.4 | 8.3 | 8.2 |
| 9X | 8.0 | 7.8 | 5.6 | 2.6 | 1.7 |
| 10X | 1.3 | | | | |

## Sand Condition

### Primary Roads

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 50.0 | 50.0 | 50.0 | 50.0 | 50.0 |
| 1X | 50.0 | 50.0 | 50.0 | 50.0 | 50.0 |
| 2X | 50.0 | 50.0 | 50.0 | 50.0 | 50.0 |
| 3X | 50.0 | 50.0 | 50.0 | 50.0 | 50.0 |
| 4X | 50.0 | 50.0 | 50.0 | 50.0 | 50.0 |
| 5X | 49.9 | 49.8 | 49.7 | 49.7 | 49.6 |
| 6X | 49.6 | 49.5 | 49.5 | 49.4 | 49.2 |
| 7X | 49.1 | 49.0 | 48.7 | 48.2 | 47.6 |
| 8X | 47.2 | 46.5 | 45.8 | 45.2 | 44.3 |
| 9X | 42.9 | 40.9 | 37.9 | 35.4 | 33.2 |
| 10X | 31.4 | | | | |

### Secondary Roads

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 50.0 | 50.0 | 50.0 | 50.0 | 50.0 |
| 1X | 50.0 | 50.0 | 50.0 | 50.0 | 50.0 |
| 2X | 50.0 | 49.4 | 48.6 | 46.6 | 44.6 |
| 3X | 42.3 | 39.7 | 36.2 | 33.5 | 31.5 |
| 4X | 29.9 | 28.5 | 27.4 | 26.4 | 25.6 |
| 5X | 24.9 | 24.2 | 23.6 | 23.1 | 22.6 |
| 6X | 22.1 | 21.7 | 21.4 | 21.0 | 20.7 |
| 7X | 20.5 | 20.2 | 20.0 | 19.8 | 19.6 |
| 8X | 19.4 | 19.2 | 19.0 | 18.9 | 18.7 |
| 9X | 18.6 | 18.5 | 18.3 | 18.2 | 18.1 |
| 10X | 17.9 | | | | |

### Trails

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 10.6 | 10.6 | 10.6 | 10.5 | 10.3 |
| 1X | 10.2 | 10.0 | 9.8 | 9.7 | 9.7 |
| 2X | 9.6 | 9.6 | 9.5 | 9.4 | 9.3 |
| 3X | 9.2 | 9.1 | 9.0 | 8.9 | 8.9 |
| 4X | 8.8 | 8.8 | 8.8 | 8.7 | 8.7 |
| 5X | 8.7 | 8.6 | 8.6 | 8.6 | 8.6 |
| 6X | 8.5 | 8.5 | 8.5 | 8.5 | 8.5 |
| 7X | 8.4 | 8.4 | 8.4 | 8.4 | 8.4 |
| 8X | 8.3 | 8.2 | 8.0 | 3.3 | 1.9 |
| 9X | 1.4 | 1.1 | 0.9 | 0.8 | 0.7 |
| 10X | 0.6 | | | | |

### Off-Road

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 13.4 | 12.0 | 11.8 | 11.7 | 11.7 |
| 1X | 11.7 | 11.6 | 11.4 | 11.1 | 10.9 |
| 2X | 10.7 | 10.5 | 10.3 | 10.1 | 10.0 |
| 3X | 9.8 | 9.7 | 9.6 | 9.5 | 9.4 |
| 4X | 9.3 | 9.2 | 9.2 | 9.1 | 9.1 |
| 5X | 9.0 | 8.9 | 8.9 | 8.8 | 8.8 |
| 6X | 8.7 | 8.6 | 8.5 | 8.3 | 8.2 |
| 7X | 8.0 | 7.7 | 7.5 | 2.8 | 1.7 |
| 8X | 1.2 | 0.9 | 0.8 | 0.7 | 0.6 |
| 9X | 0.5 | 0.5 | 0.5 | 0.4 | 0.4 |
| 10X | 0.4 | | | | |

Table B11

Speed Profiles (mph) for Vehicle 5 in Mafraq Quad (3254) in Jordan

## Dry Condition

### Primary Roads

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 32.0 | 32.0 | 32.0 | 32.0 | 32.0 |
| 1X | 32.0 | 32.0 | 32.0 | 32.0 | 32.0 |
| 2X | 32.0 | 32.0 | 32.0 | 32.0 | 31.9 |
| 3X | 31.8 | 31.8 | 31.7 | 31.7 | 31.6 |
| 4X | 31.6 | 31.6 | 31.5 | 31.5 | 31.3 |
| 5X | 31.1 | 30.9 | 30.7 | 30.5 | 30.3 |
| 6X | 30.1 | 29.9 | 29.7 | 29.5 | 29.4 |
| 7X | 29.2 | 29.1 | 29.0 | 28.8 | 28.7 |
| 8X | 28.6 | 28.4 | 28.3 | 28.2 | 28.1 |
| 9X | 27.9 | 27.4 | 26.5 | 25.6 | 24.8 |
| 10X | 24.1 | | | | |

### Secondary Roads

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 32.0 | 32.0 | 32.0 | 32.0 | 32.0 |
| 1X | 31.9 | 31.7 | 31.7 | 31.6 | 31.6 |
| 2X | 31.5 | 31.5 | 31.5 | 31.4 | 31.4 |
| 3X | 31.4 | 31.4 | 31.4 | 31.4 | 31.4 |
| 4X | 31.4 | 31.4 | 31.3 | 31.3 | 31.3 |
| 5X | 31.3 | 31.3 | 31.2 | 31.1 | 30.9 |
| 6X | 30.7 | 30.6 | 30.4 | 30.2 | 30.0 |
| 7X | 29.7 | 29.5 | 29.4 | 29.2 | 29.0 |
| 8X | 28.5 | 27.9 | 27.4 | 26.9 | 26.4 |
| 9X | 25.9 | 25.5 | 25.2 | 24.8 | 24.5 |
| 10X | 23.9 | | | | |

### Trails

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 27.7 | 27.7 | 27.7 | 27.0 | 26.2 |
| 1X | 25.6 | 25.0 | 24.7 | 24.4 | 24.0 |
| 2X | 23.5 | 23.0 | 22.7 | 22.3 | 22.0 |
| 3X | 21.7 | 21.5 | 21.2 | 21.0 | 20.8 |
| 4X | 20.5 | 20.3 | 20.0 | 19.8 | 19.6 |
| 5X | 19.4 | 19.3 | 19.1 | 19.0 | 18.9 |
| 6X | 18.7 | 18.6 | 18.5 | 18.4 | 18.2 |
| 7X | 18.1 | 17.9 | 17.8 | 17.7 | 17.5 |
| 8X | 17.4 | 17.3 | 17.1 | 17.0 | 16.9 |
| 9X | 16.7 | 16.6 | 16.4 | 16.2 | 16.0 |
| 10X | 15.4 | | | | |

### Off-Road

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 28.2 | 25.0 | 24.2 | 24.0 | 23.9 |
| 1X | 23.8 | 23.7 | 23.4 | 23.2 | 23.1 |
| 2X | 22.8 | 22.6 | 22.2 | 21.9 | 21.6 |
| 3X | 21.4 | 21.1 | 20.8 | 20.6 | 20.4 |
| 4X | 20.1 | 19.9 | 19.7 | 19.4 | 19.2 |
| 5X | 19.0 | 18.8 | 18.5 | 18.3 | 18.1 |
| 6X | 17.9 | 17.7 | 17.5 | 17.3 | 17.1 |
| 7X | 16.9 | 16.7 | 16.5 | 16.3 | 16.0 |
| 8X | 15.8 | 15.5 | 15.2 | 14.7 | 14.3 |
| 9X | 13.7 | 13.2 | 12.6 | 11.6 | 10.7 |
| 10X | 6.6 | | | | |

## Wet-Wet Slippery Condition

### Primary Roads

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 32.0 | 32.0 | 32.0 | 32.0 | 32.0 |
| 1X | 32.0 | 32.0 | 32.0 | 32.0 | 32.0 |
| 2X | 32.0 | 32.0 | 32.0 | 31.9 | 31.9 |
| 3X | 31.8 | 31.7 | 31.7 | 31.6 | 31.6 |
| 4X | 31.6 | 31.5 | 31.5 | 31.5 | 31.3 |
| 5X | 31.1 | 30.8 | 30.6 | 30.4 | 30.2 |
| 6X | 30.0 | 29.8 | 29.6 | 29.5 | 29.3 |
| 7X | 29.2 | 29.0 | 28.9 | 28.8 | 28.6 |
| 8X | 28.5 | 28.4 | 28.3 | 28.1 | 28.0 |
| 9X | 27.6 | 27.1 | 26.0 | 25.0 | 24.1 |
| 10X | 23.3 | | | | |

### Secondary Roads

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 32.0 | 32.0 | 32.0 | 32.0 | 31.9 |
| 1X | 31.8 | 31.7 | 31.6 | 31.6 | 31.5 |
| 2X | 31.5 | 31.5 | 31.4 | 31.4 | 31.4 |
| 3X | 31.4 | 31.4 | 31.4 | 31.4 | 31.4 |
| 4X | 31.3 | 31.3 | 31.3 | 31.3 | 31.3 |
| 5X | 31.2 | 31.1 | 31.0 | 30.8 | 30.6 |
| 6X | 30.5 | 30.3 | 30.2 | 29.9 | 29.7 |
| 7X | 29.5 | 29.3 | 29.1 | 28.8 | 28.5 |
| 8X | 28.1 | 27.5 | 26.9 | 26.4 | 26.0 |
| 9X | 25.6 | 25.2 | 24.8 | 24.5 | 24.2 |
| 10X | 23.6 | | | | |

### Trails

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 18.0 | 17.9 | 17.7 | 17.5 | 17.3 |
| 1X | 17.2 | 17.1 | 17.0 | 16.9 | 16.8 |
| 2X | 16.7 | 16.6 | 16.6 | 16.5 | 16.4 |
| 3X | 16.4 | 16.3 | 16.3 | 16.2 | 16.2 |
| 4X | 16.1 | 16.0 | 16.0 | 15.9 | 15.8 |
| 5X | 15.7 | 15.6 | 15.6 | 15.5 | 15.4 |
| 6X | 15.3 | 15.2 | 15.2 | 15.1 | 15.0 |
| 7X | 15.0 | 14.9 | 14.8 | 14.8 | 14.7 |
| 8X | 14.6 | 14.5 | 14.4 | 14.3 | 14.2 |
| 9X | 14.1 | 14.0 | 13.9 | 13.8 | 13.6 |
| 10X | 13.1 | | | | |

### Off-Road

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 24.5 | 21.9 | 21.7 | 21.7 | 21.7 |
| 1X | 21.6 | 21.3 | 21.0 | 20.7 | 20.4 |
| 2X | 20.1 | 19.7 | 19.4 | 19.2 | 19.0 |
| 3X | 18.8 | 18.6 | 18.4 | 18.2 | 18.0 |
| 4X | 17.9 | 17.7 | 17.5 | 17.3 | 17.1 |
| 5X | 16.9 | 16.7 | 16.5 | 16.4 | 16.2 |
| 6X | 16.0 | 15.8 | 15.7 | 15.5 | 15.3 |
| 7X | 15.1 | 15.0 | 14.8 | 14.6 | 14.3 |
| 8X | 14.1 | 13.9 | 13.6 | 13.2 | 12.8 |
| 9X | 12.4 | 12.0 | 11.4 | 10.6 | 9.9 |
| 10X | 5.3 | | | | |

## Sand Condition

### Primary Roads

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 32.0 | 32.0 | 32.0 | 32.0 | 32.0 |
| 1X | 32.0 | 32.0 | 32.0 | 32.0 | 32.0 |
| 2X | 32.0 | 32.0 | 32.0 | 31.9 | 31.9 |
| 3X | 31.8 | 31.7 | 31.7 | 31.6 | 31.6 |
| 4X | 31.6 | 31.5 | 31.5 | 31.5 | 31.3 |
| 5X | 31.0 | 30.8 | 30.6 | 30.4 | 30.2 |
| 6X | 30.0 | 29.8 | 29.6 | 29.4 | 29.3 |
| 7X | 29.1 | 29.0 | 28.9 | 28.8 | 28.6 |
| 8X | 28.5 | 28.4 | 28.2 | 28.1 | 27.9 |
| 9X | 27.5 | 26.9 | 25.8 | 24.7 | 23.8 |
| 10X | 23.0 | | | | |

### Secondary Roads

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 32.0 | 32.0 | 32.0 | 32.0 | 31.9 |
| 1X | 31.8 | 31.7 | 31.6 | 31.6 | 31.5 |
| 2X | 31.5 | 31.5 | 31.4 | 31.4 | 31.4 |
| 3X | 31.4 | 31.4 | 31.4 | 31.4 | 31.4 |
| 4X | 31.3 | 31.3 | 31.3 | 31.3 | 31.3 |
| 5X | 31.2 | 31.1 | 31.0 | 30.8 | 30.6 |
| 6X | 30.5 | 30.3 | 30.2 | 29.9 | 29.7 |
| 7X | 29.5 | 29.3 | 29.1 | 28.8 | 28.5 |
| 8X | 28.1 | 27.5 | 26.9 | 26.4 | 26.0 |
| 9X | 25.6 | 25.2 | 24.8 | 24.5 | 24.2 |
| 10X | 23.6 | | | | |

### Trails

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 15.2 | 15.2 | 15.2 | 15.2 | 15.1 |
| 1X | 15.1 | 15.1 | 15.1 | 15.0 | 14.9 |
| 2X | 14.8 | 14.7 | 14.6 | 14.5 | 14.4 |
| 3X | 14.4 | 14.3 | 14.2 | 14.1 | 14.0 |
| 4X | 14.0 | 13.9 | 13.8 | 13.7 | 13.6 |
| 5X | 13.6 | 13.5 | 13.4 | 13.4 | 13.3 |
| 6X | 13.3 | 13.2 | 13.1 | 13.1 | 13.0 |
| 7X | 13.0 | 12.9 | 12.8 | 12.8 | 12.7 |
| 8X | 12.6 | 12.5 | 12.4 | 12.3 | 12.0 |
| 9X | 11.8 | 11.5 | 11.3 | 11.0 | 10.8 |
| 10X | 10.5 | | | | |

### Off-Road

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 15.2 | 15.1 | 14.8 | 14.6 | 14.5 |
| 1X | 14.4 | 14.2 | 14.1 | 14.0 | 13.9 |
| 2X | 13.7 | 13.6 | 13.5 | 13.4 | 13.3 |
| 3X | 13.2 | 13.2 | 13.1 | 13.0 | 13.0 |
| 4X | 12.9 | 12.9 | 12.8 | 12.7 | 12.7 |
| 5X | 12.6 | 12.5 | 12.4 | 12.3 | 12.2 |
| 6X | 12.1 | 12.0 | 11.9 | 11.8 | 11.6 |
| 7X | 11.5 | 11.4 | 11.2 | 11.0 | 10.8 |
| 8X | 10.6 | 10.3 | 10.1 | 9.9 | 9.7 |
| 9X | 9.5 | 9.2 | 8.9 | 8.4 | 8.0 |
| 10X | 5.0 | | | | |

Table B12

Speed Profiles (mph) for Vehicle 6 in Mafraq Quad (3254) in Jordan

## Dry Condition

### Primary Roads

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 50.0 | 50.0 | 50.0 | 50.0 | 50.0 |
| 1X | 50.0 | 50.0 | 50.0 | 50.0 | 50.0 |
| 2X | 50.0 | 50.0 | 49.8 | 49.7 | 49.6 |
| 3X | 49.4 | 49.3 | 49.3 | 49.2 | 49.1 |
| 4X | 49.0 | 49.0 | 48.9 | 48.7 | 48.6 |
| 5X | 48.4 | 48.1 | 47.7 | 47.3 | 46.9 |
| 6X | 46.5 | 46.2 | 45.9 | 45.6 | 45.3 |
| 7X | 45.0 | 44.8 | 44.5 | 44.3 | 44.0 |
| 8X | 43.7 | 43.4 | 43.0 | 42.6 | 42.1 |
| 9X | 41.2 | 39.8 | 37.5 | 35.5 | 33.7 |
| 10X | 32.2 | | | | |

### Secondary Roads

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 50.0 | 50.0 | 49.3 | 48.8 | 48.6 |
| 1X | 48.5 | 48.4 | 48.3 | 48.3 | 48.2 |
| 2X | 48.2 | 47.9 | 47.6 | 46.2 | 44.7 |
| 3X | 42.9 | 40.5 | 36.9 | 34.2 | 32.0 |
| 4X | 30.3 | 28.9 | 27.7 | 26.7 | 25.9 |
| 5X | 25.2 | 24.5 | 23.8 | 23.2 | 22.7 |
| 6X | 22.3 | 21.9 | 21.5 | 21.2 | 20.9 |
| 7X | 20.6 | 20.3 | 20.1 | 19.9 | 19.7 |
| 8X | 19.5 | 19.3 | 19.1 | 19.0 | 18.8 |
| 9X | 18.7 | 18.5 | 18.4 | 18.3 | 18.2 |
| 10X | 18.0 | | | | |

### Trails

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 10.6 | 10.6 | 10.6 | 10.6 | 10.6 |
| 1X | 10.6 | 10.5 | 10.3 | 10.1 | 10.0 |
| 2X | 9.9 | 9.8 | 9.8 | 9.7 | 9.6 |
| 3X | 9.5 | 9.4 | 9.3 | 9.2 | 9.1 |
| 4X | 9.1 | 9.0 | 9.0 | 8.9 | 8.9 |
| 5X | 8.8 | 8.8 | 8.8 | 8.7 | 8.7 |
| 6X | 8.7 | 8.7 | 8.6 | 8.6 | 8.6 |
| 7X | 8.6 | 8.6 | 8.5 | 8.5 | 8.5 |
| 8X | 8.5 | 8.5 | 8.5 | 8.4 | 8.4 |
| 9X | 8.4 | 8.4 | 8.4 | 8.3 | 8.3 |
| 10X | 8.2 | | | | |

### Off-Road

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 27.8 | 12.6 | 12.4 | 12.4 | 12.4 |
| 1X | 12.4 | 12.3 | 12.2 | 12.0 | 11.8 |
| 2X | 11.5 | 11.3 | 11.0 | 10.8 | 10.6 |
| 3X | 10.5 | 10.3 | 10.2 | 10.0 | 9.9 |
| 4X | 9.8 | 9.7 | 9.6 | 9.5 | 9.4 |
| 5X | 9.3 | 9.3 | 9.2 | 9.2 | 9.1 |
| 6X | 9.1 | 9.0 | 9.0 | 8.9 | 8.9 |
| 7X | 8.8 | 8.8 | 8.7 | 8.7 | 8.6 |
| 8X | 8.5 | 8.4 | 8.3 | 8.2 | 8.0 |
| 9X | 2.9 | 1.8 | 1.3 | 1.1 | 0.9 |
| 10X | 0.8 | | | | |

## Wet-Wet Slippery Condition

### Primary Roads

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 50.0 | 50.0 | 50.0 | 50.0 | 50.0 |
| 1X | 50.0 | 50.0 | 50.0 | 50.0 | 50.0 |
| 2X | 50.0 | 50.0 | 49.8 | 49.7 | 49.5 |
| 3X | 49.4 | 49.3 | 49.2 | 49.2 | 49.1 |
| 4X | 49.0 | 49.0 | 48.8 | 48.7 | 48.5 |
| 5X | 48.4 | 48.0 | 47.5 | 47.1 | 46.7 |
| 6X | 46.3 | 46.0 | 45.7 | 45.4 | 45.1 |
| 7X | 44.9 | 44.6 | 44.3 | 44.1 | 43.6 |
| 8X | 43.2 | 42.8 | 42.3 | 41.8 | 41.2 |
| 9X | 40.1 | 38.5 | 36.1 | 33.9 | 32.1 |
| 10X | 30.5 | | | | |

### Secondary Roads

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 50.0 | 50.0 | 49.3 | 48.8 | 48.6 |
| 1X | 48.5 | 48.4 | 48.3 | 48.3 | 48.2 |
| 2X | 48.2 | 47.7 | 47.0 | 45.2 | 43.5 |
| 3X | 41.4 | 38.9 | 35.6 | 33.0 | 31.1 |
| 4X | 29.5 | 28.2 | 27.1 | 26.2 | 25.4 |
| 5X | 24.7 | 24.1 | 23.4 | 22.9 | 22.4 |
| 6X | 22.0 | 21.6 | 21.2 | 20.9 | 20.6 |
| 7X | 20.4 | 20.1 | 19.9 | 19.7 | 19.5 |
| 8X | 19.3 | 19.1 | 19.0 | 18.8 | 18.7 |
| 9X | 18.5 | 18.4 | 18.3 | 18.2 | 18.1 |
| 10X | 17.8 | | | | |

### Trails

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 10.6 | 10.6 | 10.6 | 10.4 | 10.0 |
| 1X | 9.8 | 9.7 | 9.6 | 9.5 | 9.5 |
| 2X | 9.4 | 9.3 | 9.3 | 9.2 | 9.1 |
| 3X | 9.0 | 8.9 | 8.9 | 8.8 | 8.8 |
| 4X | 8.7 | 8.7 | 8.7 | 8.6 | 8.6 |
| 5X | 8.6 | 8.6 | 8.5 | 8.5 | 8.5 |
| 6X | 8.5 | 8.5 | 8.4 | 8.4 | 8.4 |
| 7X | 8.4 | 8.4 | 8.4 | 8.3 | 8.3 |
| 8X | 8.3 | 8.3 | 8.2 | 8.2 | 8.2 |
| 9X | 8.1 | 8.1 | 8.1 | 8.0 | 8.0 |
| 10X | 7.9 | | | | |

### Off-Road

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 19.4 | 12.3 | 12.3 | 12.3 | 12.3 |
| 1X | 12.3 | 12.2 | 12.0 | 11.8 | 11.6 |
| 2X | 11.3 | 11.0 | 10.8 | 10.6 | 10.4 |
| 3X | 10.3 | 10.1 | 10.0 | 9.8 | 9.7 |
| 4X | 9.6 | 9.5 | 9.4 | 9.4 | 9.3 |
| 5X | 9.2 | 9.2 | 9.1 | 9.1 | 9.0 |
| 6X | 8.9 | 8.9 | 8.8 | 8.7 | 8.6 |
| 7X | 8.5 | 8.4 | 8.3 | 8.2 | 8.1 |
| 8X | 8.0 | 3.7 | 2.0 | 1.4 | 1.1 |
| 9X | 0.9 | 0.8 | 0.7 | 0.6 | 0.5 |
| 10X | 0.5 | | | | |

## Sand Condition

### Primary Roads

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 50.0 | 50.0 | 50.0 | 50.0 | 50.0 |
| 1X | 50.0 | 50.0 | 50.0 | 50.0 | 50.0 |
| 2X | 50.0 | 50.0 | 49.8 | 49.7 | 49.5 |
| 3X | 49.4 | 49.3 | 49.2 | 49.2 | 49.1 |
| 4X | 49.0 | 48.9 | 48.7 | 48.6 | 48.4 |
| 5X | 48.3 | 47.9 | 47.4 | 47.0 | 46.6 |
| 6X | 46.3 | 45.9 | 45.6 | 45.3 | 45.1 |
| 7X | 44.8 | 44.6 | 44.3 | 43.9 | 43.4 |
| 8X | 43.0 | 42.5 | 42.0 | 41.5 | 40.8 |
| 9X | 39.6 | 38.0 | 35.5 | 33.3 | 31.4 |
| 10X | 29.8 | | | | |

### Secondary Roads

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 50.0 | 50.0 | 49.3 | 48.8 | 48.6 |
| 1X | 48.5 | 48.4 | 48.3 | 48.3 | 48.2 |
| 2X | 48.2 | 47.7 | 47.0 | 45.2 | 43.5 |
| 3X | 41.4 | 38.9 | 35.6 | 33.0 | 31.1 |
| 4X | 29.5 | 28.2 | 27.1 | 26.2 | 25.4 |
| 5X | 24.7 | 24.1 | 23.4 | 22.9 | 22.4 |
| 6X | 22.0 | 21.6 | 21.2 | 20.9 | 20.6 |
| 7X | 20.4 | 20.1 | 19.9 | 19.7 | 19.5 |
| 8X | 19.3 | 19.1 | 19.0 | 18.8 | 18.7 |
| 9X | 18.5 | 18.4 | 18.3 | 18.2 | 18.1 |
| 10X | 17.8 | | | | |

### Trails

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 10.6 | 10.6 | 10.4 | 10.1 | 9.8 |
| 1X | 9.7 | 9.6 | 9.4 | 9.3 | 9.1 |
| 2X | 9.0 | 8.9 | 8.8 | 8.7 | 8.7 |
| 3X | 8.6 | 8.6 | 8.6 | 8.5 | 8.5 |
| 4X | 8.5 | 8.4 | 8.4 | 8.4 | 8.4 |
| 5X | 8.4 | 8.3 | 8.3 | 8.3 | 8.3 |
| 6X | 8.3 | 8.2 | 8.2 | 8.2 | 8.1 |
| 7X | 8.1 | 8.1 | 8.1 | 8.0 | 8.0 |
| 8X | 8.0 | 8.0 | 7.9 | 4.8 | 2.3 |
| 9X | 1.6 | 1.2 | 1.0 | 0.8 | 0.7 |
| 10X | 0.6 | | | | |

### Off-Road

PERCENT TOTAL DISTANCE

| | X=0 | 2 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| X | 12.7 | 11.5 | 11.1 | 11.0 | 11.0 |
| 1X | 10.9 | 10.8 | 10.7 | 10.5 | 10.2 |
| 2X | 10.1 | 9.9 | 9.7 | 9.6 | 9.4 |
| 3X | 9.3 | 9.2 | 9.2 | 9.1 | 9.0 |
| 4X | 9.0 | 8.9 | 8.9 | 8.8 | 8.7 |
| 5X | 8.7 | 8.6 | 8.5 | 8.5 | 8.4 |
| 6X | 8.3 | 8.3 | 8.2 | 8.0 | 7.9 |
| 7X | 7.8 | 7.6 | 3.9 | 1.9 | 1.3 |
| 8X | 1.0 | 0.8 | 0.7 | 0.6 | 0.6 |
| 9X | 0.5 | 0.5 | 0.4 | 0.4 | 0.4 |
| 10X | 0.4 | | | | |

Table B13

Speed Profiles (mph) for Vehicle 1 in Dasht-E Arzhan (6349 II) in Iran, Dry Condition

| Secondary Roads | | | | | | Trails | | | | | | Off-Road | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PERCENT TOTAL DISTANCE | | | | | | PERCENT TOTAL DISTANCE | | | | | | PERCENT TOTAL DISTANCE | | | | | |
| | X=0 | 2 | 4 | 6 | 8 | | X=0 | 2 | 4 | 6 | 8 | | X=0 | 2 | 4 | 6 | 8 |
| X | 47.9 | 47.9 | 47.3 | 41.5 | 35.7 | X | 15.0 | 14.3 | 14.2 | 14.2 | 14.2 | X | 10.6 | 10.3 | 9.9 | 9.5 | 9.2 |
| 1X | 31.2 | 28.5 | 26.8 | 25.7 | 24.8 | 1X | 14.1 | 14.1 | 14.1 | 14.1 | 14.0 | 1X | 9.0 | 8.8 | 8.7 | 8.6 | 8.6 |
| 2X | 24.2 | 23.7 | 23.4 | 23.0 | 22.8 | 2X | 13.5 | 13.1 | 12.6 | 12.2 | 11.9 | 2X | 8.5 | 8.4 | 8.4 | 8.3 | 8.2 |
| 3X | 22.5 | 22.4 | 22.2 | 22.0 | 21.9 | 3X | 11.6 | 11.4 | 11.2 | 11.0 | 10.9 | 3X | 8.1 | 8.1 | 8.0 | 8.0 | 7.9 |
| 4X | 21.8 | 21.7 | 21.6 | 21.5 | 21.4 | 4X | 10.7 | 10.6 | 10.5 | 10.4 | 10.3 | 4X | 7.8 | 7.6 | 7.4 | 7.3 | 7.2 |
| 5X | 21.1 | 20.7 | 20.4 | 20.1 | 19.8 | 5X | 10.2 | 10.1 | 10.0 | 9.9 | 9.9 | 5X | 7.1 | 7.0 | 6.8 | 4.1 | 1.7 |
| 6X | 19.5 | 19.3 | 19.1 | 18.8 | 18.6 | 6X | 9.8 | 9.7 | 9.7 | 9.6 | 9.5 | 6X | 1.1 | 0.8 | 0.7 | 0.6 | 0.5 |
| 7X | 18.3 | 18.0 | 17.8 | 17.5 | 17.2 | 7X | 9.5 | 9.4 | 9.4 | 9.3 | 9.3 | 7X | 0.5 | 0.4 | 0.4 | 0.4 | 0.3 |
| 8X | 17.0 | 16.8 | 16.6 | 16.4 | 16.2 | 8X | 9.3 | 9.2 | 9.2 | 9.2 | 9.1 | 8X | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 |
| 9X | 16.0 | 15.8 | 15.6 | 15.3 | 15.1 | 9X | 9.1 | 9.1 | 9.0 | 9.0 | 8.9 | 9X | 0.3 | 0.2 | 0.2 | 0.2 | 0.2 |
| 10X | 14.8 | | | | | 10X | 8.8 | | | | | 10X | 0.2 | | | | |

Table B14

Speed Profiles (mph) for Vehicle 2 in Dasht-E Arzhan (6349 II) in Iran, Dry Condition

| Secondary Roads | | | | | | Trails | | | | | | Off-Road | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PERCENT TOTAL DISTANCE | | | | | | PERCENT TOTAL DISTANCE | | | | | | PERCENT TOTAL DISTANCE | | | | | |
| | X=0 | 2 | 4 | 6 | 8 | | X=0 | 2 | 4 | 6 | 8 | | X=0 | 2 | 4 | 6 | 8 |
| X | 47.9 | 47.9 | 47.1 | 41.3 | 35.4 | X | 15.0 | 14.3 | 14.2 | 14.2 | 14.2 | X | 10.6 | 10.3 | 9.9 | 9.4 | 9.2 |
| 1X | 30.9 | 28.3 | 26.6 | 25.5 | 24.7 | 1X | 14.1 | 14.1 | 14.1 | 14.1 | 14.0 | 1X | 9.0 | 8.8 | 8.7 | 8.6 | 8.5 |
| 2X | 24.1 | 23.7 | 23.3 | 23.0 | 22.7 | 2X | 13.6 | 13.1 | 12.6 | 12.2 | 11.9 | 2X | 8.5 | 8.4 | 8.3 | 8.3 | 8.2 |
| 3X | 22.5 | 22.3 | 22.1 | 22.0 | 21.9 | 3X | 11.6 | 11.4 | 11.2 | 11.0 | 10.9 | 3X | 8.2 | 8.1 | 8.1 | 8.0 | 7.8 |
| 4X | 21.8 | 21.7 | 21.6 | 21.5 | 21.3 | 4X | 10.7 | 10.6 | 10.5 | 10.4 | 10.3 | 4X | 7.7 | 7.5 | 7.4 | 7.3 | 7.2 |
| 5X | 21.0 | 20.6 | 20.3 | 20.0 | 19.7 | 5X | 10.2 | 10.1 | 10.0 | 9.9 | 9.9 | 5X | 7.1 | 7.0 | 6.8 | 6.7 | 3.0 |
| 6X | 19.5 | 19.2 | 19.0 | 18.8 | 18.5 | 6X | 9.8 | 9.7 | 9.7 | 9.6 | 9.5 | 6X | 1.5 | 1.0 | 0.8 | 0.7 | 0.6 |
| 7X | 18.2 | 17.9 | 17.6 | 17.4 | 17.1 | 7X | 9.5 | 9.4 | 9.4 | 9.3 | 9.3 | 7X | 0.5 | 0.5 | 0.4 | 0.4 | 0.4 |
| 8X | 16.9 | 16.7 | 16.5 | 16.3 | 16.1 | 8X | 9.3 | 9.2 | 9.2 | 9.2 | 9.1 | 8X | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 |
| 9X | 15.9 | 15.7 | 15.4 | 15.2 | 14.9 | 9X | 9.1 | 9.1 | 9.0 | 9.0 | 8.9 | 9X | 0.3 | 0.3 | 0.2 | 0.2 | 0.2 |
| 10X | 14.6 | | | | | 10X | 8.8 | | | | | 10X | 0.2 | | | | |

Table B15

Speed Profiles (mph) for Vehicle 3 in Dasht-E Arzhan (6349 II) in Iran, Dry Condition

| Secondary Roads | | | | | |
|---|---|---|---|---|---|
| PERCENT TOTAL DISTANCE | | | | | |
| | X=0 | 2 | 4 | 6 | 8 |
| X | 43.9 | 43.9 | 42.6 | 37.0 | 34.1 |
| 1X | 32.5 | 31.6 | 30.9 | 30.4 | 30.1 |
| 2X | 29.8 | 29.6 | 29.4 | 29.2 | 29.1 |
| 3X | 29.0 | 28.9 | 28.8 | 28.7 | 28.7 |
| 4X | 28.6 | 28.4 | 28.2 | 28.0 | 27.9 |
| 5X | 27.7 | 27.6 | 27.5 | 27.3 | 27.0 |
| 6X | 26.6 | 26.2 | 25.9 | 25.5 | 25.1 |
| 7X | 24.7 | 24.3 | 23.8 | 23.4 | 23.0 |
| 8X | 22.6 | 22.3 | 21.9 | 21.6 | 21.3 |
| 9X | 20.9 | 20.5 | 20.0 | 19.6 | 19.1 |
| 10X | 18.6 | | | | |

| Trails | | | | | |
|---|---|---|---|---|---|
| PERCENT TOTAL DISTANCE | | | | | |
| | X=0 | 2 | 4 | 6 | 8 |
| X | 24.8 | 24.8 | 24.8 | 24.8 | 24.8 |
| 1X | 24.8 | 24.8 | 24.8 | 24.6 | 23.9 |
| 2X | 22.9 | 21.9 | 21.1 | 20.5 | 20.0 |
| 3X | 19.6 | 19.3 | 19.0 | 18.8 | 18.5 |
| 4X | 18.3 | 18.0 | 17.8 | 17.6 | 17.4 |
| 5X | 17.2 | 17.0 | 16.8 | 16.6 | 16.4 |
| 6X | 16.1 | 15.9 | 15.6 | 15.4 | 15.1 |
| 7X | 14.9 | 14.7 | 14.5 | 14.3 | 14.0 |
| 8X | 13.8 | 13.6 | 13.4 | 13.2 | 13.0 |
| 9X | 12.8 | 12.6 | 12.4 | 12.2 | 12.0 |
| 10X | 11.7 | | | | |

| Off-Road | | | | | |
|---|---|---|---|---|---|
| PERCENT TOTAL DISTANCE | | | | | |
| | X=0 | 2 | 4 | 6 | 8 |
| X | 20.5 | 19.3 | 18.3 | 17.0 | 16.2 |
| 1X | 15.5 | 15.1 | 14.7 | 14.3 | 14.0 |
| 2X | 13.8 | 13.5 | 13.3 | 13.1 | 12.9 |
| 3X | 12.7 | 12.6 | 12.4 | 12.2 | 12.0 |
| 4X | 11.8 | 11.6 | 11.4 | 11.2 | 11.0 |
| 5X | 10.8 | 10.5 | 10.3 | 10.0 | 9.5 |
| 6X | 9.0 | 8.5 | 8.1 | 7.7 | 7.1 |
| 7X | 4.7 | 2.1 | 1.3 | 1.0 | 0.8 |
| 8X | 0.7 | 0.6 | 0.5 | 0.5 | 0.5 |
| 9X | 0.4 | 0.4 | 0.4 | 0.3 | 0.3 |
| 10X | 0.3 | | | | |

Table B16

Speed Profiles (mph) for Vehicle 4 in Dasht-E Arzhan (6349 II) in Iran, Dry Condition

| Secondary Roads | | | | | | Trails | | | | | | Off-Road | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | PERCENT TOTAL DISTANCE | | | | | | PERCENT TOTAL DISTANCE | | | | | | PERCENT TOTAL DISTANCE | | | | | |
| | X=0 | 2 | 4 | 6 | 8 | | X=0 | 2 | 4 | 6 | 8 | | X=0 | 2 | 4 | 6 | 8 |
| X | 50.0 | 50.0 | 49.9 | 46.2 | 42.2 | X | 15.0 | 14.3 | 14.2 | 14.2 | 14.2 | X | 12.3 | 10.3 | 9.9 | 9.5 | 9.3 |
| 1X | 36.7 | 32.6 | 28.5 | 25.6 | 23.7 | 1X | 14.1 | 14.1 | 14.1 | 14.1 | 14.0 | 1X | 9.1 | 9.0 | 8.9 | 8.8 | 8.7 |
| 2X | 22.3 | 21.3 | 20.6 | 20.0 | 19.5 | 2X | 13.7 | 13.2 | 12.7 | 12.3 | 11.9 | 2X | 8.7 | 8.6 | 8.6 | 8.5 | 8.5 |
| 3X | 19.1 | 18.8 | 18.5 | 18.2 | 18.0 | 3X | 11.7 | 11.4 | 11.2 | 11.1 | 10.9 | 3X | 8.4 | 8.4 | 8.4 | 8.4 | 8.3 |
| 4X | 17.8 | 17.6 | 17.5 | 17.3 | 17.2 | 4X | 10.8 | 10.7 | 10.5 | 10.4 | 10.3 | 4X | 8.3 | 8.2 | 8.2 | 8.1 | 8.1 |
| 5X | 17.1 | 17.0 | 16.9 | 16.8 | 16.7 | 5X | 10.2 | 10.1 | 10.1 | 10.0 | 9.9 | 5X | 8.0 | 7.9 | 7.7 | 7.6 | 7.3 |
| 6X | 16.6 | 16.5 | 16.4 | 16.3 | 16.3 | 6X | 9.8 | 9.7 | 9.7 | 9.6 | 9.6 | 6X | 7.1 | 6.8 | 6.5 | 5.7 | 2.3 |
| 7X | 16.2 | 16.1 | 16.0 | 15.9 | 15.8 | 7X | 9.5 | 9.5 | 9.4 | 9.4 | 9.3 | 7X | 1.4 | 1.0 | 0.8 | 0.7 | 0.6 |
| 8X | 15.7 | 15.6 | 15.5 | 15.5 | 15.4 | 8X | 9.3 | 9.3 | 9.2 | 9.2 | 9.2 | 8X | 0.5 | 0.5 | 0.4 | 0.4 | 0.4 |
| 9X | 15.3 | 15.2 | 15.1 | 14.9 | 14.7 | 9X | 9.1 | 9.1 | 9.1 | 9.0 | 9.0 | 9X | 0.4 | 0.3 | 0.3 | 0.3 | 0.3 |
| 10X | 14.5 | | | | | 10X | 8.9 | | | | | 10X | 0.3 | | | | |

Table B17

Speed Profiles (mph) for Vehicle 5 in Dasht-E Arzhan (6349 II) in Iran, Dry Condition

| Secondary Roads | | | | | |
|---|---|---|---|---|---|
| PERCENT TOTAL DISTANCE | | | | | |
| | X=0 | 2 | 4 | 6 | 8 |
| X | 31.2 | 31.2 | 31.2 | 31.2 | 31.2 |
| 1X | 31.2 | 31.2 | 31.2 | 31.2 | 31.2 |
| 2X | 31.2 | 31.2 | 31.2 | 31.2 | 31.2 |
| 3X | 31.2 | 31.2 | 31.2 | 31.2 | 31.2 |
| 4X | 31.2 | 31.2 | 31.2 | 31.0 | 30.7 |
| 5X | 30.4 | 30.1 | 29.7 | 29.3 | 28.7 |
| 6X | 28.1 | 27.4 | 26.9 | 26.3 | 25.8 |
| 7X | 25.3 | 24.8 | 24.3 | 23.8 | 23.4 |
| 8X | 23.0 | 22.7 | 22.3 | 21.9 | 21.6 |
| 9X | 21.1 | 20.7 | 20.2 | 19.7 | 19.2 |
| 10X | 18.7 | | | | |

| Trails | | | | | |
|---|---|---|---|---|---|
| PERCENT TOTAL DISTANCE | | | | | |
| | X=0 | 2 | 4 | 6 | 8 |
| X | 28.2 | 28.2 | 28.2 | 28.2 | 28.2 |
| 1X | 28.2 | 27.9 | 27.6 | 27.4 | 27.3 |
| 2X | 27.2 | 27.0 | 26.9 | 26.8 | 26.6 |
| 3X | 26.4 | 26.2 | 26.1 | 26.0 | 25.8 |
| 4X | 25.6 | 25.4 | 25.2 | 25.0 | 24.7 |
| 5X | 24.5 | 24.3 | 24.0 | 23.7 | 23.4 |
| 6X | 23.2 | 23.0 | 22.8 | 22.5 | 22.3 |
| 7X | 22.0 | 21.8 | 21.6 | 21.4 | 21.2 |
| 8X | 21.0 | 20.7 | 20.5 | 20.3 | 20.0 |
| 9X | 19.7 | 19.4 | 19.1 | 18.8 | 18.4 |
| 10X | 17.5 | | | | |

| Off-Road | | | | | |
|---|---|---|---|---|---|
| PERCENT TOTAL DISTANCE | | | | | |
| | X=0 | 2 | 4 | 6 | 8 |
| X | 28.2 | 23.7 | 22.8 | 22.0 | 21.3 |
| 1X | 20.8 | 20.3 | 19.9 | 19.4 | 18.7 |
| 2X | 18.1 | 17.6 | 17.2 | 16.8 | 16.4 |
| 3X | 16.1 | 15.8 | 15.6 | 15.3 | 15.0 |
| 4X | 14.7 | 14.4 | 14.2 | 13.9 | 13.6 |
| 5X | 13.3 | 13.0 | 12.6 | 12.3 | 11.9 |
| 6X | 11.5 | 11.1 | 10.7 | 10.3 | 9.8 |
| 7X | 9.3 | 8.7 | 8.2 | 7.7 | 7.2 |
| 8X | 6.4 | 2.9 | 1.8 | 1.3 | 1.0 |
| 9X | 0.8 | 0.7 | 0.6 | 0.6 | 0.5 |
| 10X | 0.5 | | | | |

Table B18

Speed Profiles (mph) for Vehicle 6 in Dasht-E Arzhan (6349 II) in Iran, Dry Condition

| Secondary Roads | | | | | | Trails | | | | | | Off-Road | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PERCENT TOTAL DISTANCE | | | | | | PERCENT TOTAL DISTANCE | | | | | | PERCENT TOTAL DISTANCE | | | | | |
| | X=0 | 2 | 4 | 6 | 8 | | X=0 | 2 | 4 | 6 | 8 | | X=0 | 2 | 4 | 6 | 8 |
| X | 47.9 | 47.9 | 45.4 | 34.6 | 29.0 | X | 15.0 | 11.5 | 11.1 | 10.9 | 10.9 | X | 8.7 | 8.6 | 8.5 | 8.4 | 8.3 |
| 1X | 25.2 | 22.4 | 20.3 | 19.0 | 18.1 | 1X | 10.8 | 10.8 | 10.8 | 10.8 | 10.7 | 1X | 8.2 | 8.1 | 8.1 | 8.0 | 8.0 |
| 2X | 17.4 | 16.9 | 16.5 | 16.1 | 15.9 | 2X | 10.6 | 10.3 | 10.1 | 9.9 | 9.8 | 2X | 7.9 | 7.9 | 7.8 | 7.8 | 7.7 |
| 3X | 15.6 | 15.4 | 15.3 | 15.1 | 15.0 | 3X | 9.6 | 9.5 | 9.4 | 9.3 | 9.3 | 3X | 7.7 | 7.7 | 7.6 | 7.6 | 7.5 |
| 4X | 14.9 | 14.8 | 14.7 | 14.6 | 14.5 | 4X | 9.2 | 9.1 | 9.1 | 9.0 | 9.0 | 4X | 7.4 | 7.3 | 7.1 | 7.0 | 6.9 |
| 5X | 14.5 | 14.4 | 14.3 | 14.2 | 14.0 | 5X | 8.9 | 8.9 | 8.8 | 8.8 | 8.8 | 5X | 6.8 | 6.7 | 6.6 | 4.0 | 1.7 |
| 6X | 13.9 | 13.8 | 13.6 | 13.5 | 13.4 | 6X | 8.7 | 8.7 | 8.6 | 8.6 | 8.6 | 6X | 1.1 | 0.8 | 0.7 | 0.6 | 0.5 |
| 7X | 13.3 | 13.2 | 13.1 | 13.0 | 12.9 | 7X | 8.5 | 8.5 | 8.5 | 8.4 | 8.4 | 7X | 0.5 | 0.4 | 0.4 | 0.4 | 0.3 |
| 8X | 12.8 | 12.6 | 12.5 | 12.4 | 12.3 | 8X | 8.4 | 8.3 | 8.3 | 8.3 | 8.2 | 8X | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 |
| 9X | 12.3 | 12.2 | 12.1 | 12.0 | 11.9 | 9X | 8.2 | 8.2 | 8.2 | 8.1 | 8.1 | 9X | 0.3 | 0.2 | 0.2 | 0.2 | 0.2 |
| 10X | 11.7 | | | | | 10X | 8.0 | | | | | 10X | 0.2 | | | | |

Table B1*

Percent of Distance NOGO on Trails and Percent of Area NOGO Off-Road for Selected Surface Conditions in the Lauterbach and Schotten Quads Located in the Federal Republic of Germany

| Vehicles | Trails* | | | Off-Road** | | | | |
|---|---|---|---|---|---|---|---|---|
| | Insufficient Soil Strength | Insufficient Traction | Total NOGO | Insufficient Soil Strength | Insufficient Traction | Obstacle Interference and Traction | Combination of Following: Obstacles, Vegetation, Soil, & Slope | Total NOGO |
| **Dry Condition** | | | | | | | | |
| 1 | 0.0 | 0.0 | 0.0 | 0.3 | 4.3 | 7.2 | 3.2 | 15.0 |
| 2 | 0.0 | 0.0 | 0.0 | 0.2 | 6.1 | 6.4 | 0.9 | 13.6 |
| 3 | 0.0 | 0.0 | 0.0 | 0.2 | 2.8 | 3.3 | 1.1 | 7.3 |
| 4 | 0.0 | 0.0 | 0.0 | 0.1 | 2.7 | 4.1 | 0.8 | 7.6 |
| 5 | 0.0 | 0.0 | 0.0 | 0.0 | 1.7 | 0.3 | 0.9 | 2.9 |
| 6 | 0.0 | 0.0 | 0.0 | 0.3 | 4.3 | 7.2 | 3.2 | 15.0 |
| **Wet Normal Condition** | | | | | | | | |
| 1 | 1.5 | 0.0 | 1.5 | 62.0 | 3.5 | 2.6 | 1.0 | 69.1 |
| 2 | 0.0 | 0.0 | 0.0 | 29.9 | 9.0 | 4.5 | 1.2 | 44.6 |
| 3 | 0.0 | 0.0 | 0.0 | 39.6 | 4.9 | 2.0 | 1.9 | 48.5 |
| 4 | 0.0 | 0.0 | 0.0 | 2.4 | 11.2 | 4.0 | 2.0 | 19.6 |
| 5 | 0.0 | 0.0 | 0.0 | 0.0 | 4.0 | 0.3 | 1.3 | 5.7 |
| 6 | 1.5 | 0.0 | 1.5 | 62.0 | 3.5 | 2.6 | 1.0 | 69.1 |
| **Wet-Wet Slippery Condition** | | | | | | | | |
| 1 | 1.5 | 0.0 | 1.5 | 66.7 | 5.0 | 2.5 | 0.4 | 74.6 |
| 2 | 1.5 | 0.0 | 1.5 | 35.1 | 20.8 | 4.5 | 1.2 | 61.7 |
| 3 | 1.5 | 0.0 | 1.5 | 44.7 | 14.2 | 2.0 | 0.8 | 61.7 |
| 4 | 0.0 | 0.0 | 0.0 | 5.1 | 20.8 | 3.9 | 3.3 | 33.1 |
| 5 | 0.0 | 0.0 | 0.0 | 0.1 | 7.0 | 0.4 | 1.3 | 8.8 |
| 6 | 1.5 | 0.0 | 1.5 | 66.7 | 5.0 | 2.5 | 0.4 | 74.6 |
| **Snow Condition** | | | | | | | | |
| 1 | 0.0 | 0.0 | 0.0 | 0.0 | 17.4 | 7.2 | 2.0 | 26.6 |
| 2 | 0.0 | 0.0 | 0.0 | 0.0 | 16.6 | 6.4 | 1.5 | 24.5 |
| 3 | 0.0 | 0.0 | 0.0 | 0.0 | 12.4 | 3.3 | 1.3 | 17.0 |
| 4 | 0.0 | 0.0 | 0.0 | 0.0 | 17.8 | 4.1 | 2.0 | 23.8 |
| 5 | 0.0 | 0.0 | 0.0 | 0.0 | 11.9 | 1.7 | 1.3 | 15.0 |
| 6 | 0.0 | 0.0 | 0.0 | 0.0 | 17.4 | 7.2 | 2.0 | 26.6 |

* NOGO data from Schotten quad.
** NOGO data from Lauterbach quad.

Table B20

Percent of Distance NOGO on Trails and Percent of Area NOGO Off-Road for Selected Surface Conditions in the Mafraq Quad Located in Jordan

| Vehicles | Trails | | | Off-Road | | | | |
|---|---|---|---|---|---|---|---|---|
| | Insufficient Soil Strength | Insufficient Traction | Total NOGO | Insufficient Soil Strength | Insufficient Traction | Obstacle Interference and Traction | Combination of Following: Obstacles, Vegetation, Soil & Slope | Total NOGO |
| **Dry Condition** | | | | | | | | |
| 1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 12.0 | 0.0 | 12.0 |
| 2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 10.3 | 0.0 | 10.3 |
| 3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2.0 | 0.0 | 2.0 |
| 4 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 5.2 | 0.0 | 5.2 |
| 5 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.5 | 0.0 | 0.5 |
| 6 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 12.0 | 0.0 | 12.0 |
| **Wet-Wet Slippery Condition** | | | | | | | | |
| 1 | 0.0 | 0.0 | 0.0 | 7.9 | 0.3 | 10.7 | 0.2 | 19.2 |
| 2 | 0.0 | 0.0 | 0.0 | 0.8 | 0.9 | 10.3 | 0.2 | 12.2 |
| 3 | 0.0 | 0.0 | 0.0 | 0.8 | 1.1 | 2.0 | 0.4 | 4.3 |
| 4 | 0.0 | 0.0 | 0.0 | 0.0 | 1.0 | 5.2 | 0.2 | 6.4 |
| 5 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.8 | 0.0 | 0.8 |
| 6 | 0.0 | 0.0 | 0.0 | 7.9 | 0.3 | 10.7 | 0.2 | 19.2 |
| **Sand Condition** | | | | | | | | |
| 1 | 0.0 | 14.7 | 14.7 | 0.0 | 14.1 | 12.0 | 0.8 | 26.9 |
| 2 | 0.0 | 12.6 | 12.6 | 0.0 | 7.7 | 10.3 | 0.4 | 18.4 |
| 3 | 0.0 | 12.6 | 12.6 | 0.0 | 8.8 | 2.0 | 0.7 | 11.5 |
| 4 | 0.0 | 15.5 | 15.5 | 0.0 | 19.1 | 5.2 | 1.3 | 25.7 |
| 5 | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 | 0.5 | 0.0 | 0.7 |
| 6 | 0.0 | 14.7 | 14.7 | 0.0 | 14.1 | 12.0 | 0.8 | 26.9 |

Table B21

Percent of Distance NOGO on Trails and Percent of Area NOGO Off-Road for Dry Surface Condition in the Dasht-E Arzhan Quad Located In Iran

| Vehicles | Trails | | | Off-Road | | | | |
|---|---|---|---|---|---|---|---|---|
| | Insufficient Soil Strength | Insufficient Traction | Total NOGO | Insufficient Soil Strenth | Insufficient Traction | Obstacle Interference and Traction | Combination of Following: Obstacles, Vegetation, Soil & Slope | Total NOGO |
| 1 | 0.0 | 0.0 | 0.0 | 0.0 | 4.8 | 35.3 | 4.4 | 44.5 |
| 2 | 0.0 | 0.0 | 0.0 | 0.0 | 8.8 | 34.3 | 0.0 | 43.1 |
| 3 | 0.0 | 0.0 | 0.0 | 0.0 | 2.4 | 27.1 | 0.7 | 30.2 |
| 4 | 0.0 | 0.0 | 0.0 | 0.0 | 2.5 | 30.6 | 0.7 | 33.7 |
| 5 | 0.0 | 0.0 | 0.0 | 0.0 | 2.2 | 16.8 | 0.5 | 19.4 |
| 6 | 0.0 | 0.0 | 0.0 | 0.0 | 4.8 | 35.3 | 4.4 | 44.5 |

Table B22

Performance Data* for Study Vehicles Crossing Linear Features (Water Crossing) in the Federal Republic of Germany, Jordan, and Iran Study Areas

| Vehicle | Water Crossing Coefficient, hours per mile | | | |
|---|---|---|---|---|
| | Dry | Wet Normal | Wet-Wet Slippery | Snow |
| | Federal Republic of Germany | | | |
| 1 | 0.1013 | 0.1085 | 0.1085 | 0.1059 |
| 2 | 0.1013 | 0.1077 | 0.1077 | 0.1014 |
| 3 | 0.1000 | 0.1076 | 0.1076 | 0.1053 |
| 4 | 0.1006 | 0.1087 | 0.1087 | 0.1060 |
| 5 | 0.0404 | 0.0432 | 0.0432 | 0.0439 |
| 6 | 0.1013 | 0.1085 | 0.1085 | 0.1059 |

| | Dry | Wet-Wet Slippery | Sand |
|---|---|---|---|
| | Jordan | | |
| 1 | 0.0412 | 0.0475 | 0.0412 |
| 2 | 0.0370 | 0.0432 | 0.0370 |
| 3 | 0.0237 | 0.0296 | 0.0237 |
| 4 | 0.0242 | 0.0319 | 0.0242 |
| 5 | 0.0202 | 0.0275 | 0.0202 |
| 6 | 0.0412 | 0.0475 | 0.0412 |

| | Dry |
|---|---|
| | Iran |
| 1 | 0.0412 |
| 2 | 0.0370 |
| 3 | 0.0237 |
| 4 | 0.0242 |
| 5 | 0.0202 |
| 6 | 0.0412 |

* Units are hours lost per vehicle mile for a 10 vehicle group with a common mission.

Table B23

Mobility Rating Speeds (mph) of Study Vehicles at Tactical Mobility Levels and MICOM Mobility Level for Selected Surface Conditions of the Lauterbach Quad in the Federal Republic of Germany

| Vehicle No. | Tactical Mobility Levels | | | | | MICOM Mobility Level |
|---|---|---|---|---|---|---|
| | On-Road | Tactical Support | Tactical Standard | Tactical High | High-High | |
| | | | Dry Condition | | | |
| 1 | 19.1 | 15.7 | 11.4 | 2.4 | 0.6 | 12.1 |
| 2 | 19.2 | 15.8 | 11.4 | 2.9 | 0.7 | 12.3 |
| 3 | 23.8 | 19.5 | 13.1 | 7.3 | 1.1 | 15.2 |
| 4 | 20.3 | 16.5 | 11.9 | 6.9 | 1.0 | 12.7 |
| 5 | 21.3 | 19.7 | 15.8 | 9.9 | 2.0 | 17.5 |
| 6 | 17.1 | 14.2 | 10.5 | 2.2 | 0.6 | 11.1 |
| | | | Wet Normal Condition | | | |
| 1 | 19.0 | 4.4 | 1.2 | 0.4 | 0.1 | 1.8 |
| 2 | 19.2 | 14.8 | 1.8 | 0.4 | 0.2 | 10.6 |
| 3 | 23.8 | 17.8 | 1.8 | 0.4 | 0.2 | 12.5 |
| 4 | 20.3 | 16.8 | 10.8 | 1.4 | 0.5 | 12.0 |
| 5 | 21.0 | 18.8 | 14.3 | 8.2 | 1.2 | 15.8 |
| 6 | 17.0 | 4.3 | 1.2 | 0.4 | 0.1 | 1.7 |
| | | | Wet-Wet Slippery Condition | | | |
| 1 | 18.7 | 3.2 | 0.6 | 0.2 | 0.1 | 1.2 |
| 2 | 18.8 | 5.4 | 1.2 | 0.4 | 0.2 | 2.2 |
| 3 | 23.2 | 5.7 | 1.2 | 0.4 | 0.2 | 2.3 |
| 4 | 19.9 | 15.7 | 3.1 | 0.7 | 0.3 | 11.6 |
| 5 | 20.7 | 18.3 | 13.7 | 7.6 | 1.0 | 15.3 |
| 6 | 16.8 | 3.2 | 0.6 | 0.2 | 0.1 | 1.2 |
| | | | Snow Condition | | | |
| 1 | 16.1 | 12.5 | 4.0 | 0.9 | 0.4 | 9.1 |
| 2 | 16.2 | 12.8 | 5.0 | 1.1 | 0.4 | 9.4 |
| 3 | 20.3 | 16.8 | 11.5 | 1.9 | 0.6 | 13.3 |
| 4 | 17.7 | 14.3 | 5.7 | 1.1 | 0.4 | 10.9 |
| 5 | 19.3 | 17.9 | 14.2 | 2.6 | 0.6 | 16.1 |
| 6 | 14.8 | 11.7 | 3.9 | 0.9 | 0.3 | 8.7 |

Table B24

Mobility Rating Speeds (mph) of Study Vehicles at Tactical Mobility Levels and MICOM Mobility Level for Selected Surface Conditions of the Mafraq Quad in Jordan

| Vehicle No. | Tactical Mobility Levels | | | | | MICOM Mobility Level |
|---|---|---|---|---|---|---|
| | On-Road | Tactical Support | Tactical Standard | Tactical High | High-High | |
| | | | Dry Condition | | | |
| 1 | 16.7 | 13.2 | 11.0 | 4.2 | 0.8 | 11.6 |
| 2 | 16.8 | 13.2 | 11.1 | 7.1 | 0.9 | 11.7 |
| 3 | 24.2 | 19.3 | 13.6 | 10.1 | 3.0 | 17.4 |
| 4 | 16.9 | 13.5 | 11.5 | 8.6 | 1.4 | 12.1 |
| 5 | 24.4 | 21.4 | 17.8 | 13.6 | 5.8 | 20.1 |
| 6 | 14.2 | 11.8 | 10.0 | 4.0 | 0.8 | 10.4 |
| | | | Wet-Wet Slippery Condition | | | |
| 1 | 15.9 | 12.9 | 10.6 | 1.6 | 0.5 | 11.3 |
| 2 | 16.2 | 13.0 | 10.7 | 4.0 | 0.7 | 11.4 |
| 3 | 22.9 | 18.3 | 12.9 | 9.2 | 1.7 | 16.3 |
| 4 | 16.7 | 13.4 | 11.2 | 8.2 | 1.2 | 11.8 |
| 5 | 21.2 | 19.2 | 15.9 | 11.9 | 4.6 | 17.7 |
| 6 | 13.9 | 11.5 | 9.6 | 1.6 | 0.5 | 10.1 |
| | | | Sand Condition | | | |
| 1 | 15.8 | 12.7 | 1.3 | 0.7 | 0.4 | 11.1 |
| 2 | 15.8 | 12.8 | 1.8 | 1.1 | 0.5 | 11.2 |
| 3 | 22.2 | 17.0 | 1.9 | 1.9 | 0.8 | 15.1 |
| 4 | 16.3 | 13.2 | 1.4 | 0.7 | 0.4 | 11.8 |
| 5 | 20.1 | 17.7 | 13.9 | 10.3 | 4.5 | 16.1 |
| 6 | 13.8 | 11.5 | 1.3 | 0.7 | 0.4 | 10.1 |

Table B25

Mobility Rating Speeds (mph) of Study Vehicles at Tactical Mobility Levels and MICOM Mobility Level for Dry Surface Condition in the Dasht-E Arzhan Quad in Iran

| Vehicle No. | Tactical Mobility Levels | | | | | MICOM Mobility Level |
|---|---|---|---|---|---|---|
| | On-Road | Tactical Support | Tactical Standard | Tactical High | High-High | |
| 1 | 14.6 | 11.9 | 1.7 | 0.6 | 0.2 | 10.5 |
| 2 | 14.5 | 11.9 | 1.7 | 0.6 | 0.2 | 10.5 |
| 3 | 20.1 | 17.1 | 3.6 | 0.8 | 0.3 | 15.5 |
| 4 | 14.4 | 12.0 | 2.6 | 0.8 | 0.3 | 11.0 |
| 5 | 20.8 | 19.6 | 13.7 | 1.5 | 0.5 | 18.1 |
| 6 | 11.4 | 10.0 | 1.7 | 0.6 | 0.2 | 9.0 |

## APPENDIX C: COMPUTATION OF MOBILITY RATING SPEEDS FOR TACTICAL MOBILITY LEVELS

1. The equation for computing mobility rating speed is given as follows:

$$V_W = \frac{100}{\frac{P}{V_C} + P(T_X) + \frac{100 - P}{V_R}} \qquad (C1)$$

where

$V_W$ = mobility rating speed, mph, for a given vehicle performing a mission for a specific area and condition

$P$ = expected percentage of operating distance off-road

$V_C$ = the speed from the off-road profile, mph, corresponding to C

$C$ = the percentage of the off-road terrain that should be negotiable

$T_X$ = the time spent crossing linear features for each mile of off-road terrain traversed, hr/mile

$V_R$ = the speed from the on-road speed profiles, mph

2. $V_R$ is computed using the speeds from the separate speed profiles for operations on primary and secondary roads and trails:

$$V_R = \frac{100 - P}{\frac{P_P}{V_P} + \frac{P_S}{V_S} + \frac{P_T}{V_T}} \qquad (C2)$$

where

$P_P$ , $P_S$ , $P_T$ = percentage of the composite on- and off-road network that is primary roads, secondary roads, and trails, respectively ($P_P + P_S + P_T + P = 100$)

$V_p$ , $V_S$ , $V_T$ = speeds, mph, from the primary road, secondary road, and trail speed profiles that correspond to CP, CS, and CT, respectively.

CP, CS, CT = percentage of primary roads, secondary roads, and trails that should be negotiable (normally, CP = CS = 100)

3. Equations C1 and C2 can be combined to yield the following:

$$V_W = \frac{100}{\frac{P}{V_C} + P(T_X) + \frac{P_P}{V_P} + \frac{P_S}{V_S} + \frac{P_T}{V_T}} \qquad (C3)$$

4. Values for $P$, $P_P$, $P_S$, and $P_T$ used in this study for each area and the several levels of tactical mobility are given in Table 3, main text. Values for $V_C$, $V_P$, $V_S$, and $V_T$ are available from the speed profiles for the study vehicles given in Tables B1-B18 once seasonal conditions and values for $C$, $CP$, $CS$, and $CT$ are stated. Values for $T_X$ at three stream flow stages are available in Table B22. For the study areas involved, high water stage is associated with wet, wet-wet slippery, and snow seasonal conditions in the Federal Republic of Germany and Mid-East study areas. Average is associated with the dry and the sand surface condition in the Mid-East study areas. The low water stage is associated with the dry condition in the Federal Republic of Germany.

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Grimes, Keafur
Mobility assessment of the ROLAND Wheeled Vehicle System : Report 2 : Mobility assessment using the army mobility model / by Keafur Grimes and Donald D. Randolph (Geotechnical Laboratory, U.S. Army Engineer Waterways Experiment Station) . -- Vicksburg, Miss. : The Station ; Springfield, Va. ; available from NTIS, 1982.
81 p. in various pagings : ill. ; 27 cm. -- (Technical report ; GL-82-12, Report 2)
Cover title.
"September 1982."
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1. All terrain vehicles. 2. Vehicles, Military. I. Randolph, Donald D. II. United States. Army Missile Command. III. U.S. Army Engineer Waterways Experiment



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